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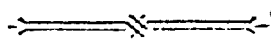
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MATERNITY
AND
INFANT WELFARE

A Handbook for Health Visitors, Parents, and
others in India

BY
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Second Edition



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PREFACE TO FIRST EDITION.

THIS book is primarily the outcome of a series of lectures given to the first class held by the Association for the Provision of Health and Maternity Supervisors. The fact that it is based on lectures given to such a class accounts both for the subjects chosen and for the limitations in their treatment. The pupils joining the class had been trained in midwifery, hence a knowledge of this is assumed to a great extent throughout the book. The same holds good with physiology, in which the pupils had had a course. It is hoped that this will not prevent the book being useful to those who have not an intimate knowledge of these subjects. Fuller treatment would have meant a work larger than was desired. The last section of the book is written peculiarly for the benefit of those training in Health Visitors' work, but it may be of interest to others who are taking up such social work in a less professional capacity.

The author hopes that the book as a whole may be useful not only to the class of people for whom it is primarily intended, but also to educated Indian parents who are striving for a better state of things, and who have little, in such a form, to guide their efforts. The public organisation of work for expectant mothers, and for infants, is as yet in a very undeveloped state in India. What is wanted, however, is not merely to rouse the public con-

science in these matters, but to appeal to the individual fathers and mothers who are bringing up the present generation. If the more educated in the community awake to the needs of their own children, they are more likely to try to introduce methods which will be of use to the community at large in dealing with similar problems. It will be very gratifying to the writer if this book can help in any degree towards such an end.

In any case no apology is needed for the publication of a book of this kind, as the need for it is great. It is the realisation of this need which has led the Health Association to undertake its publication. It is for others to judge how far the present book is a successful endeavour to fill the acknowledged gap. Its defects are apparent to the author herself, and will be obvious to many who read the book. Perhaps the greatest difficulty in writing it has been to reconcile the high standard at which we ought to aim with the practical difficulties to be encountered. There are those who will criticise the following pages because the standard held up is not sufficiently high, while there are others who will doubtless exclaim that it is impossible to put into practice, in India, all that is recommended. It is not intended to disarm criticism at the outset by this apologia, but only to ask critics to keep the two points of view in mind. The author is only too conscious that she has not always successfully steered between the Scylla of an unduly low standard and the Charybdis of impracticability. It should be noticed also that the author's experience has been gained wholly in North India.

The author is indebted in various ways for help in the writing and publication of the book. As regards Infant Welfare the works of Dr. John Thomson and Dr. Holton

diseases of children, and *Infant Feeding and Allied Topics* by Dr. Lowenberg have been of the greatest use, together with Dr. Truby King's invaluable works, *The Expectant Mother* and *Feeding and Care of Baby*. Other works have been consulted to a lesser extent as necessity arose. Thanks for more personal help and encouragement are specially due to Dr. M. I. Balfour, and Dr. C. L. Houlton, and to my husband for revising the MS. and aid in proof correcting.

RUTH YOUNG.

DELHI,
November, 1919.

PREFACE TO SECOND EDITION.

THE second edition of this book does not differ substantially from the first. Necessary corrections and alterations have been made, but very little new matter has been added. As Infant Welfare work is now spreading throughout the whole of India, it is impossible to notice all the forms it takes, or to mention all the localities where it is being developed. There is as yet little co-ordination among the various efforts, and no one scheme has been worked out as the best for India or any of its provinces. This is bound to be the case for some years; in the meantime what is desirable is that workers should be bold in experiment and in casting off what is proving useless. The training of Health Visitors is also still in the experimental stage. It is hoped that this little book will continue to be useful to those studying the subject.

RUTH YOUNG.

BROUGHTY FERRY;

SCOTLAND;

July 1921.

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PART ONE.
THE HYGIENE OF PREGNANCY AND
THE PUERPERIUM.

1. THE PHYSIOLOGY OF NORMAL PREGNANCY.

The general objects of ante-natal hygiene or the care of the mother before the birth of her child may be set down as follows.

1. We aim at making the period of pregnancy natural and healthy for the mother.

2. We try, through keeping the pregnant woman under observation, to detect abnormal conditions before they are dangerous, and to remove them if possible.

3. We attempt through the mother, to surround the unborn child with the best conditions, and so to produce a strong, healthy baby.

4. We try to secure that the time of labour shall be free from danger, and to make it a less painful process.

In order to study how we are to achieve these objects, we must first of all rapidly survey what takes place in normal pregnancy.

After conception has taken place, which usually occurs in the Fallopian tube, the ovum passes into the uterus, and settles down in the uterine wall. Certain changes take place at the same time in the uterus itself. The lining membrane or *endometrium* is no longer shed at regular intervals with the discharge of a certain amount of blood. Hence the menstrual period ceases. The muscle of the uterus begins to grow, and the whole organ

becomes more vascular, that is, receives a larger blood supply. Although at first the ovum lies actually in the wall of the uterus, later on the *foetus*, as it is called, is found in the cavity of the organ where it floats in the *liquor amnii*. It is attached to the placenta, and so to the uterine wall, by means of the umbilical cord, which consists of the blood-vessels which convey the blood to and from the placenta. The placenta is formed partly from the original coverings of the ovum, and partly from the endometrium of the uterus. It consists of a spongy mass of tissue containing large blood spaces where the blood of the foetus and that of the mother come into very intimate contact, being only separated by the thinnest of membranes. Thus the exchange of various substances between the two blood systems is made easy.

By the end of the third month the uterus has risen out of the pelvis and is now an abdominal organ. At the sixth month it has reached the level of the umbilicus, while by the time the ninth month is reached, it is as high as the ensiform cartilage or breast bone. During the last month of pregnancy, the uterus somewhat descends again into the pelvis, especially in the case of *primiparae*, or women, who are bearing their first child.

The first symptom of pregnancy noticed by the patient herself is usually the *absence of the menstrual period*. We have seen that the reason for this is that the lining membrane of the uterus has prepared itself for the reception of the ovum, and so is not shed as usual. If a woman who is young and healthy, ceases to menstruate, she is in all probability pregnant. The only other causes for the stoppage of the menses in a healthy woman are lactation, and the menopause. If a patient suspects herself from other causes to be pregnant, and yet has a dis-

charge, she should be advised to see a doctor. It occasionally happens that a patient has a discharge for one or two months at the time when the period would ordinarily occur, and still is pregnant in a normal manner. But it is safer for such patients to have themselves examined by a doctor. Irregular hæmorrhage indicates some abnormal condition which should be enquired into at once.

The date of the last menstrual period should be carefully noted by the woman who has become pregnant. We reckon the date of labour from the date of the last period. Nine months and seven days are added to the date of the first day of the period, and this gives us approximately the date at which the delivery is to be expected. It may happen that a woman becomes pregnant while lactating, and hence in the absence of the period. In such a case the patient may find it difficult to know when to expect delivery. She should be examined more than once by a doctor, who by ascertaining the height of the uterus and from other signs, will be able to help her to arrive at the approximate date. She should also make a careful note of the time when foetal movements are first observed by her as this corresponds roughly to the middle of pregnancy.

The menstrual periods are frequently absent or irregular in young women through anæmia or some wasting disease. In such cases the patient or her relatives may believe her to be pregnant whereas in reality she is not. If the Health Visitor suspects such an occurrence, she should try to persuade the patient to see a doctor, in order that appropriate treatment may be given and future disappointment avoided.

The next symptom which the patient notices is usually *enlargement of the breasts accompanied by pain*. This

occurs quite early in pregnancy. It does not usually give the patient any real trouble. If the breasts are very large and heavy they may need the support of a wide bandage. If the nipples are sore they may require the application of some ointment (see *care of the breasts*, page 13).

Morning sickness troubles many patients. It varies from slight nausea to severe vomiting. Ordinarily it ceases after three months. Unfortunately very little can be done to alleviate this complaint, but the patient should not be encouraged to think it a serious symptom or to treat herself as an invalid as a result of it. The more she can lead an ordinary healthy life, the less it will probably affect her. She should keep the bowels open, and eat simple food. She may be advised to take some food before rising in the morning, and to keep lying down for an hour or two afterwards if possible. If the vomiting becomes constant and severe, so that the patient begins to lose weight, or if it continues after the fourth month of pregnancy, she should be advised to see a doctor.

Frequent micturition is a symptom which often occurs owing to the pressure of the uterus on the bladder. It is worst in the first few months, and again in the last month of pregnancy.

Constipation also troubles some women. It likewise is due in part to pressure, and sometimes to intestinal upset. It is a symptom which should never be neglected.

Pruritis or itching in the region of the vulva is sometimes troublesome. It can be relieved by bathing with a simple lotion which any doctor will prescribe.

From the fourth month onwards the pregnant woman will herself notice the *enlargement of the abdomen* due to

the presence of the child. At the fourth or fifth month she will also become aware of the *fœtal movements*.

There are other symptoms which may accompany pregnancy, such as neuralgia, nervous depression, and others. The Health Visitor can often help to lessen these with sympathetic advice and encouragement. They are none of them serious.

II. GENERAL CARE DURING PREGNANCY.

The objects of our care in this period are really two-fold. We are caring for the mother and for the child. At this period indeed we can only reach the child through the mother. The state of the mother vitally affects the state of the child. We have only to consider the exceedingly close connection between the mother and child during pregnancy to realise that fact. The child at this time has no life apart from the mother. It is therefore true to say that, during these months, "the health of the mother is the health of the baby." In the placenta the blood systems of mother and child are separated only by the most delicate membrane, and through this the supplies of air and nourishment pass from mother to child, and the child's waste products are carried away by the mother's blood. The blood passing from the mother to the child's body is arterial or pure blood, that which passes from the child to the mother is venous or impure blood. If the mother does not keep herself in good health if she fails to eat the proper amount of easily digested, nourishing food, if she does not breathe fresh air, if she allows herself to become constipated, all these things affect her child. Even the mental state of the mother appears to influence the child. The mother, who is nervous, fretful and worried during pregnancy, is not likely to have a child with such an even temperament as the mother

who is happy and free from care during this period. In addition the mother affords her child warmth and protection from external pressure or shock, and her own body needs special care on this account.

We shall now consider the conditions necessary to secure a healthy environment for the mother during the time of pregnancy.

FRESH AIR.

At first sight it may seem that to preach the necessity of fresh air in India is superfluous, for the majority of the people live a good deal in the open air. There are at least three ways, however, in which fresh air is lost to the people, especially to the women, of the country. First there is the overcrowding and the bad construction of houses in the city bazaars. Secondly there is the social custom of purdah, which necessitates the confinement of many women in houses or narrow courtyards for the greater part of their lives. And thirdly there is the habit of sleeping in shut up rooms in the cold weather at least, and frequently with the bed coverings pulled over the head. In addition to these there is the fact that most women, at the time of delivery if not before, are placed in an inner room of the house to which practically no fresh air can gain access, and kept there till they are "purified." In a crowded city fresh air is very hard to obtain. When in addition we have women living under the purdah system, it is obvious that they do not get sufficient fresh air for ordinary life, much less for the extra strain of pregnancy. Health Visitors must encourage the women under their care to take as much advantage as they can of what fresh air there is. In most of the larger towns there are gardens to which even women who observe

purdah may go. They should also be encouraged to take every advantage of courtyards or verandahs about their own houses and to use the roofs when available in the morning and evening. Sleeping in the open air or in verandahs must be encouraged. If it is too cold to sleep out of doors (which is only the case for a very short time of the year even in North India), the doors and windows should be left open. The coverings should never be pulled over the head, as is very commonly done. If the head is covered, the fresh air cannot reach the lungs, and the same air, which has just left the lungs, is again inspired. Health Visitors should try to explain to expectant mothers and also to their husbands, the special necessity for fresh air during pregnancy, owing to the dependence of the child upon the mother at this time, and the action of fresh air in purifying the blood and invigorating the whole system.

LIGHT AND SUNSHINE.

These are closely related to the subject of fresh air. We all know that light is necessary for the normal development of plants and animals. We cannot grow plants in the dark: if we try to do so, we find leaves produced with no green colour in them, and the growth of the whole plant suffers. The same is the case with animals. Of late years doctors have come to realise the healing value of direct sunshine in various diseases, notably tuberculosis. Light and sunshine have the same effect in promoting the healthy development of human beings. In India there is fortunately no lack of sunshine during the greater part of the year. If it were not so, conditions would be very much worse than they are. Sunshine is the enemy of disease, and it helps to keep

many places sweet and clean which would otherwise be foul and foster disease. But the question we must ask ourselves is how much light actually penetrates into the houses of a bazaar in a large city. The streets are narrow, and the houses are high, so that the sun has not much chance of reaching the rooms. In the poorer houses, moreover, there is generally only a door and no window and in the back rooms there is no direct access for either light or air. The Health Visitor must encourage the women to take advantage of all the light there is, and explain the reasons for doing so. Unfortunately it is not in her power to do much to alter the bad conditions which limit the supply of light and sun.

CLEANLINESS IN THE HOME.

Cleanliness in the surroundings is an essential condition for proper hygiene. Dirt and disease, generally speaking, go hand in hand. The standard of cleanliness varies immensely in the different communities and classes of India. There are many houses which we visit in India where everything is beautifully clean from the cooking vessels downwards. But as a general rule we find that though the cooking vessels may shine brightly, there is a rapid falling off when we turn to other parts of the house and surroundings. Even those who keep their immediate neighbourhood clean, have little sense of the need for cleanliness in the community as a whole. Hence they have no hesitation in depositing their refuse immediately outside their own house or compound with no regard whatever to the public health or convenience. Thus we find food remains and other waste material thrown outside the house into the street or other equally unsuitable place. Much of this habit is due to ignorance, the people simply

not realising that it is harmful. Much is also due to the fact that the class of sweepers exists, whose sole means of earning a living is by removing such refuse. This work is mostly performed in an exceedingly inefficient manner. The sweeper who is cleaning a compound or a room does not really remove dirt at all. He merely transfers it from one place to another. The dust or dirt is seldom collected in a dust bin from where it could be removed by municipal carts or other arrangement. Not only is this not done, but the dust becomes a positive danger by being spread in the air, and its power of carrying disease is thus enhanced. Another danger in the home, especially in households where purdah is observed, is that arising from faulty arrangements for latrines and for their emptying and cleansing. The latrine is frequently too near the living rooms, and it is not efficiently attended to. Children are not taught clean habits from the start of life, and are accustomed to defaecate and urinate in open places. Even the instant attendance of a sweeper does not render this practice hygienic or free from danger. No child should be allowed to contract a habit of this kind, and mothers must be warned against encouraging the practice. All these things tend to make the atmosphere foul instead of sweet, encourage the breeding of flies, and attract rats. The pregnant woman breathes this air, and its impurities are conveyed directly into her system with a correspondingly bad effect on her general health.

PERSONAL HYGIENE.

The care of the pregnant woman's own body needs just as much attention as the surroundings in which she lives. We shall find as a rule that the standard for personal cleanliness is higher than that for the immediate environment. There are, however, many patients who need ad-

vice on such apparently simple matters. The importance of daily bathing must be emphasised. Thorough cleansing of the body is even more necessary during pregnancy than at ordinary times. This is because the presence of visible dirt means that invisible germs are also present in large numbers, and these may cause serious illness at the time of delivery. In addition there is the fact that the skin is one of the excretory organs, on which an extra strain is placed during pregnancy, and that therefore its pores must be kept clean and open in order that they may do their work properly. In particular the region of the vulva should be thoroughly washed with soap and hot water daily. Too hot baths are not advisable during pregnancy. The teeth should be carefully cleansed as at all times, and in addition should be examined and attended to by a dentist if necessary.

The care of the breasts needs special mention. Soon after pregnancy has been established, the breasts become enlarged and begin to secrete a clear fluid, the *colostrum*. In the early months of pregnancy all that is required is to keep the breasts clean like other parts of the body, washing them with warm water and soap and drying them carefully afterwards. A month or two before the expected date of delivery, however, they should have special attention. If the nipples are small or sunken, they should be massaged daily and pulled out between the finger and thumb. This will help to form them and make them become more erect. Bathing the breasts with cold water helps to give them tone, promotes the secretion of milk and tends to harden the skin, so lessening the risks of cracks and fissures. If the nipples are sore and cracked, a little vaseline may be applied, but it is better to try and make the skin resistant in the beginning. 'Applica-

tions of glycerine and spirits are often used, but they tend to make the skin leathery.

The subject of *clothing* does not require much space. Fortunately the clothing worn by most women in India is loose and comfortable, and needs no alteration to make it suit the needs of pregnancy. Some women may require support to the abdomen if the muscles have not recovered their tone after a previous confinement. In such cases it helps to prevent the condition known as "pendulous belly," and tends to make the head remain over the brim of the pelvis. The support should take the form of a binder, that is a piece of stout cotton cloth about fifteen inches wide, which is wound firmly two or three times round the abdomen, and fixed with safety pins. It must be accurately applied or it is of little value. The Health Visitor may show the patient how it is to be put on.

Among Indian girls who go to school and among those who are more advanced and educated, the habit of wearing English shoes is becoming common. There is no objection to this if the shoes are of the proper shape, that is, with round toes and low heels. Unfortunately, we much more frequently see pointed toes and high heels which slope, and thus do not give a proper support to the body. This is very bad at any time, but more especially in pregnancy, for high heels alter the balance of the body which has already been changed by the presence of the child. ("High heels tilt the front part of the body forwards, and necessitate an increased throwing back of the shoulders, which is always present to a certain extent in pregnancy.")

The diet of pregnant women should be simple and easily digested. They should avoid hot spices. Owing

to their sedentary indoor life Indian women sometimes tend to eat too little during pregnancy. The value of milk in all forms should be emphasised. The standard foods in use in India are all good, *atta*, rice, dal, etc., etc. Towards the end of pregnancy patients may find it helpful to eat more frequently and in smaller quantities. This avoids so much discomfort from the pressure of the uterus on the stomach. If the diet is sometimes too meagre, the opposite mistake of eating too much can also be made. It is essential that women should avoid indigestion and constipation in pregnancy, and eating too much while at the same time taking too little exercise, renders a woman liable to these complaints.

Constipation is liable to be a source of trouble at all times but especially in the first three months and the last month of pregnancy. It is most important that there should be regular daily action of the bowels. No accumulation of waste products should be allowed in the system. The vegetable diet of Hindus should help to keep them free of constipation. Patients should be advised to eat fresh fruit and porridge made from "*dalya*," and avoid white bread. They may also be told to drink water in the early morning and between meals. Exercise helps to keep the bowels regular. Most women get a certain amount of exercise in doing their cooking and other house work, but in addition to this there should be daily walking in the open air. If the constipation is very obstinate the patient should be advised to see a doctor. She should not attempt to treat herself with aperients and laxatives without a doctor's advice.

While pregnant women should be advised to take regular exercise, they should avoid lifting heavy weights, stooping and similar exertion. The great majority of

women in India do their ordinary household work during pregnancy as a matter of course, and this is as it should be. We should not encourage women to think themselves invalids during pregnancy. This, however, seldom happens except among the rich and the idle.

If a woman has a tendency to abortions, it is advisable for her to rest during the time when the menstrual period would have occurred. If there is any pain in the lower abdomen or any discharge, the patient should go to bed at once and a doctor's advice should be taken.

Pregnancy should be a quiet and happy time and free from anxiety and worry. The expectant mother should have sufficient sleep which should be unbroken. Even if there are other children in the family who are quite young, they need not disturb the mother's rest if they are properly trained. The majority of women in India look forward to motherhood as a natural and inevitable part of their lives. They do not usually worry or complain much during the time of waiting, and bear the minor ailments of pregnancy with a good deal of fortitude. The Health Visitor, by means of simple advice, may often help to make things easier for the expectant mother, and show her how to keep in better health, so ensuring for her a stronger healthier baby.

III. ABNORMAL CONDITIONS DURING PREGNANCY.

Since our aim in ante-natal hygiene is not only to keep the pregnant woman in good health, but to be on the look-out for diseased conditions, and prevent their occurrence, we must now consider what are the conditions which may arise during pregnancy and endanger the life of the mother or the unborn child.

EXCESSIVE ANÆMIA.

Severe anæmia or bloodlessness may occur in pregnant women from more than one cause. It may be due to simple debility, and malnutrition. In that case it can be successfully treated by a more hygienic life and the use of simple drugs. On the other hand the cause may be much more serious. It may be that some real blood disease is present, or the patient is suffering from tuberculosis, or from kidney disease. She may also be losing blood through hæmorrhage. These conditions can only be discovered if the patient is examined by a qualified doctor, and the Health Visitor must report such a case to a doctor.

EXCESSIVE VOMITING.

If the vomiting of pregnancy becomes so severe and continuous that the patient loses weight and becomes very

weak, some treatment is necessary. The patient must be seen by a doctor in order that the proper treatment may be carried out. In certain cases it is necessary to interrupt the pregnancy, as the mother's life is in danger. A doubtful case should be shown to a doctor early rather than late, as it sometimes happens that the patient has become too weak to bear the shock of having abortion brought on.

OEDEMA OF THE FEET AND FACE.

Swelling in the feet or face is usually due to kidney disease, but it may also be due to anæmia, and to pressure on the pelvic veins by the uterus, especially in the latter months of pregnancy. This is a symptom which should never be regarded lightly, as there is always a possibility that the very serious condition of puerperal eclampsia is threatening. Therefore in any case of swelling of the feet or face the urine should be at once tested for albumin. Threatened eclampsia is usually accompanied by other symptoms such as headaches, dizziness, flashes of light before the eyes, and perhaps scanty urine. Any one of these things alone in a pregnant woman should make one suspect that something is wrong. The Health Visitor must examine the urine at once, and have the patient placed under a doctor's care without delay.

HÆMORRHAGE.

Bleeding from the vagina in pregnancy is another serious symptom. It may arise from some local disease of the uterus such as cancer of the cervix, or a polyp. In the early months of pregnancy, it may be due to threatened abortion. If occurring in the latter months of pregnancy, it usually means that the placenta is becoming

detached from its site. This can happen with a normally situated placenta, which becomes prematurely detached (*ante partum* hæmorrhage). Or it may be that the placenta has fixed itself in the lower uterine segment, and becomes loosened by the contraction of that part of the uterus (*placenta prævia*). Hæmorrhage in any form must be attended to at once. The lives of both mother and child are in danger. The Health Visitor must put the patient to bed and tell her to keep perfectly quiet till the doctor has seen her.

PAIN.

Pain in the lower abdomen may be due to threatened abortion, in which case it will usually be accompanied by some discharge. It may be however that pregnancy has occurred in the Fallopian tube and abortion has taken place from there or that the tube has ruptured as a result of the growth of the ovum. The pain in this case is usually of a severe character and sudden in its onset. The loss of blood from the internal hæmorrhage may be severe enough to cause loss of consciousness. If such hæmorrhage, due to extra-uterine pregnancy occurs, it usually does so shortly after the beginning of the pregnancy. The patient may have missed only one menstrual period. Accompanying, or shortly after the onset of the pain, there is usually some slight uterine discharge, owing to the fact that a decidua has formed in the uterus even though the pregnancy is not in that organ. When abortion or rupture of the tube takes place the decidua is shed. Such a condition is of course a very serious one, and treatment in a hospital is the best thing for the patient.

Pain may also be due to displacement of the uterus. If pregnancy occurs in a uterus which is retroverted (or

fallen backwards), the uterus is not able to pass into the abdomen as the fundus gets obstructed by the promontory of the sacrum. The uterus tries to go on growing in this cramped position, but cannot do so in the normal way. The result is pain, and pressure on both the rectum and the bladder. If a pregnant woman complains of pain accompanied by frequent micturition and constipation, we must suspect that there is a displacement of the uterus. The displacement may also be to one side, and be caused by the presence of adhesions, the result of an old inflammation. An active inflammation may also be present.

In all cases of pain, an attempt must be made to find out the cause and have it treated.

PURULENT VAGINAL DISCHARGE, OR SORES ON THE GENITALS.

Some women complain of an excessive white discharge during pregnancy. Ordinary white discharge may have no particular significance, being merely due to the activity of the glands of the vaginal mucous membrane. If the discharge is yellow, foul-smelling, or resembling pus, its cause must be enquired into; similarly if the patient complains of a sore. The discharge may be due to cancer of the cervix, to gonorrhœa, or to inflammation of the vagina or cervix. A sore may be a simple inflammation, or it may be due to syphilis. It is important to secure the treatment of such conditions, not merely because they are of themselves objectionable, but because of the risk they add to childbirth through the septic condition which is present.

STUNTED GROWTH OR LAMENESS.

If a Health Visitor notices that a pregnant woman is very small or walks with a limp, or, if she is consulted by

such a patient, it is exceedingly important to have the patient examined by a doctor. One of the most serious things that can happen in childbirth is the presence of a contracted pelvis which will not allow of the normal passage of a child. The lives of both mother and child are frequently lost in such cases because the condition is not discovered till the labour has actually begun, and it then proves too late to do anything. The pelvis may be small simply from all round underdevelopment and premature child-bearing on the part of the mother. Or she may have suffered from rickets as a child and so the bones of the pelvis may be deformed. Or she may have developed osteomalacia, or possess some congenital deformity.

Such patients must be fully warned of the danger they are in if they do not consult a doctor and make adequate arrangements for the confinement. If an operation such as Caesarean Section is to be required the patient should be urged to enter a hospital, and should not delay going till the last moment when pains have already set in, as this makes the operation much less safe for both the mother and child.

PENDULOUS ABDOMEN.

A pendulous abdomen, or unusual abdominal enlargement, especially in a primipara, leads to the suspicion that the pelvis is very small, or that some other cause is obstructing the entry of the head into the brim. In both cases careful diagnosis is needed. Unusual enlargement of the abdomen may also be due to excess of *liquor amnii*, or to there being two children in the uterus, or to a transverse position of the child. Another possible cause is an ovarian cyst, with or without pregnancy. A woman may consider herself pregnant owing to enlargement of the

abdomen, when in reality the enlargement is due to the presence of a cyst and there is no pregnancy at all. In multiparae who have had many children, the abdomen tends to become pendulous owing to the relaxation of the abdominal muscles. This condition may make it difficult for the head to enter the pelvic brim, so that such patients should see a doctor even though previous labours have been normal.

FEVERS DURING PREGNANCY.

High fever is always serious during pregnancy, as abortion is then very likely to occur. Pregnant women should avoid coming into contact with any cases of infectious disease, lest they also fall victims to it. They should also take necessary precautions against malaria.

CONCLUSION.

If a pregnant woman is under the observation of a doctor or a Health Visitor during the time of pregnancy, the occurrence of these abnormal conditions could be detected at once and suitable treatment given. Thus many lives would be saved, both of mothers and babies, and much suffering and ill health prevented. It is not the habit in India for prospective mothers to place themselves under the care of a doctor. But the Health Visitor should do all in her power to establish this practice. If a pregnant woman seeks advice from a Health Visitor, the latter should try to keep her under observation during the remainder of the pregnancy, and if necessary induce her to pay visits to a doctor. She should also make enquiries as to the past history of the patient. This will help her to judge as to whether the labour is likely to be a normal one or not. Enquiries should be made about the general

health, then as to the menstrual history, and, in the case of a multipara, about the previous pregnancies and labours. If the patient has had one or more labours in a normal fashion previously, and is at the time in good health, we are justified in supposing that with proper care she will be easily delivered. If on the other hand she has a history of long difficult labours, the use of instruments for delivery, fits during labour, still-born children, or any other abnormality, the case must be regarded as serious, and every effort made to have the patient placed under the treatment of a doctor.

IV. TESTING OF URINE.

The testing of the urine has already been mentioned in connection with some of the abnormal conditions which may occur during pregnancy. It is necessary for Health Visitors to be able to test the urine in order that such conditions may be detected. All pregnant women should have their urine tested. The testing may be done when the fact of pregnancy is reported, and it must be done again at least once a month during the last three months of pregnancy. This should be done for all expectant mothers whether in good health or bad. The presence of albumin may be detected in the urine long before the patient herself has noticed anything abnormal, and so may give warning of probable future trouble.

A specimen of urine must be obtained from the patient. It should be collected in a clean, wide-mouthed bottle. If the patient is clean and intelligent she may be instructed to collect all the urine for twenty-four hours, and a portion of that may be given for testing. If not, the patient had better pass a specimen of urine, and at once give it to be tested.

A portion of the specimen should be placed in a long narrow glass for testing the specific gravity. This is done with a urinometer, an instrument like a lactometer. The urinometer sinks to a certain level in the fluid, and the level is read off on the scale of the instrument. The

normal specific gravity of urine varies between 1015 and 1025. A very high and a very low specific gravity are both abnormal, and should be noted.

In testing urine the following things are required:—litmus paper, a test tube, a spirit lamp, a small quantity of concentrated nitric acid, and a small quantity of dilute acetic acid. The urine is first of all tested with litmus paper to see whether it is acid or alkaline. Acid urine will turn blue litmus paper red, whereas alkaline urine will turn red litmus paper blue. The litmus paper should be wetted with ordinary water before being dipped in the urine. Normally the urine is slightly acid. It becomes alkaline through standing.

There are two tests for the presence of albumin.

1. Boiling test.

If the urine is alkaline a small quantity of dilute acetic acid is first added to it to make it acid. If this is not done a turbidity may appear in the urine on heating which is due to the presence of phosphates.

The test tube is filled about one third full of urine and a small quantity of acetic acid added. It is then heated over the spirit lamp until it begins to boil. If it remains clear, then no albumin is present. If it becomes opaque, albumin is present and the amount can be roughly gauged by the density of the cloud.

2. Nitric Acid test.

About a quarter of an inch of nitric acid is poured into a dry test tube. Then some urine is poured carefully into the test tube, which should be tilted on one side while doing so, so that the urine flows gently on to the surface of the nitric acid. If albumin is present, an opaque ring

will appear at the junction of the two liquids. If after standing for half a minute, no turbidity appears, the urine is free from albumin.

V. SYPHILIS, GONORRHOEA, AND TUBERCULOSIS IN RELATION TO PREGNANCY.

All these diseases are extremely serious in their bearing on the welfare of mothers and children. They need special mention for this reason.

Syphilis is an infectious disease which is usually communicated from one person to another during sexual connection, but persons may be infected in other ways also, *e.g.*, kissing, suckling. The infecting agent is a bacterium called the *spirocheta pallida*. It penetrates the skin or mucous membrane, and at this point a *chancre*, or sore develops. The chancre takes three to four weeks to develop after infection. Shortly after its appearance the neighbouring glands become enlarged, *e.g.*, if the chancre is on the genital organs the glands of the groin will become enlarged. These two symptoms constitute the primary stage of syphilis. After forty to fifty days the secondary period commences, and it lasts for two or three years. The beginning of the secondary stage means that the infection has become general, *i.e.*, that the organism has spread throughout the whole body. In this stage the chief symptoms are eruptions on the skin and mucous membranes, sometimes fever, enlargement of various glands especially about the neck, falling out of the hair, and swellings, called *condylomata*, about the genital organs. In the tertiary stage which lasts for many years,

the disease may affect nearly every organ in the body. The nervous system is attacked, and the brain is often affected. In fact syphilis is one of the most frequent causes of insanity.

If the effects of syphilis were confined to the person who contracted the disease, that would be bad enough. But the case is worse, for the parents pass on the disease to their children. The children may be born with symptoms of syphilis, in which case they are small, weak, and atrophied. More usually the child is born apparently healthy and the symptoms develop after a few weeks. They are usually wakefulness and crying at night, constant nasal discharge, skin eruptions chiefly on the palms, soles, face and buttocks, and enlargement of the spleen. As the child grows up, if he survives, the second teeth come in notched, the bridge of the nose is depressed, scars are seen at the corners of the mouth, and there may be inflammation of the eyes and deafness.

Frequently no children are born of syphilitic parents. Syphilis is a cause of sterility in the male and the most frequent single cause of abortion in women. If therefore a patient has a history of frequent abortions, she should be strongly advised to see a doctor, lest syphilis be present.

It is easy to see what a terrible scourge syphilis is, and what an amount of loss of life and suffering this one disease causes.

The treatment of syphilis is very lengthy, and very few women in India realise the danger they or their children are in sufficiently to persist long enough in the treatment. This is very bad, for treatment properly carried out can do a great deal to lessen the suffering and bad effects of the disease. Health Visitors must do all in

their power to have treatment properly carried out in syphilitic cases.

Gonorrhœa is also a disease which is conveyed from one person to another chiefly through sexual intercourse. It is due to an organism called the *gonococcus*. It affects first the mucous membranes of the genito-urinary organs, *i.e.*, the vulva, Bartholin's glands, the vagina, the cervix and the urethra. Later it may spread throughout the system. From the cervix it commonly spreads up through the uterus to the Fallopian tubes, and causes inflammation there. The inflammation may even spread from the free end of the tube to the peritoneum, sometimes with fatal results. When the tubes are infected we usually find that the tubes, ovaries and uterus are matted together with inflammation, and even after the acute stage has passed, adhesions remain which cause a great deal of pain, and very often render the woman sterile. Such patients have chronic pain in the lower abdomen, with vaginal discharge. These symptoms, together with the sterility, induce them to come to hospitals for treatment, but it is sad to have to say it, very little can be done to alleviate their misery, and real cure is almost impossible. Once the upper part of the genital canal is infected, we can hardly ever be sure that the patient is cured. The organisms lodge in the folds of the mucous membrane, and after giving rise to no symptoms for months and even years, may then from some cause or other suddenly become active again. An old case of gonorrhœa is often stimulated into new activity during labour, and the patient may suffer from puerperal sepsis in one form or another as a result.

Gonorrhœa is not transmitted to the offspring in the same way as syphilis. But there is a danger that during

labour a patient suffering from gonorrhœa may infect the child's eyes during its passage through the vagina. This is the chief reason why we wash out the child's eyes so carefully after birth. If an infection of the eyes takes place and is untreated, blindness may be the result. The majority of cases of congenital blindness are really due to gonorrheal infection at or immediately after birth. Between them the two diseases of syphilis and gonorrhœa are the most frequent causes of blindness.

Tuberculosis perhaps comes next in importance to the two preceding diseases in connection with childbearing. There are two main reasons for this. Tuberculosis is a mildly infectious disease. It is not transmitted to the children in the same way as syphilis, but the children inherit the predisposition to tuberculosis. Children of tubercular parents are more likely to get the disease than children of healthy parents, even if they are separated from their parents from birth, and so not exposed to infection from them. In the second place tubercular patients stand pregnancy very badly. A tubercular mother may have one healthy child, and even bear a second child, but she is unlikely to recover from further pregnancies. Such patients must be fully warned of the risk to themselves and to their children, and every effort should be made to see that they get proper treatment. The Health Visitor may advise one or two essential points. 1. Fresh air and sunlight, which are absolutely necessary. It should be explained how these help in fighting the disease. 2. Rest as long as there is any fever. 3. Ample nourishment. 4. Collection and disinfection of sputum to prevent spread of infection. (For protection of the children see page 123.)

done by re-
 to keep her
 of difficulty in
 ne prevention of
 by a doctor when
 regular intervals subse-
 placement of the uterus

VI. ABORTION AND STILLBIRTH

PREVENTION

A. ABORTION should not give rise to abor-
 id be given advice as to how
 Abortion or miscarriage during pregnancy to avoid risks
 on before the expiry of six months with the loss of the child.
 and the foetus is discharged properly instructed as to the
viable, that is, before it If all pelvic troubles were ade-
 apart from the mother's condition would be much less frequent.
 usually applied if they rely to displacements of the uterus,
 is after the sixth month much as endometritis. In regular ex-
 is most common in kind, systemic causes, as mentioned
 the formation of the tumour discovered, and could be treated.

There is no doubt treatment of syphilis is specially im-
 portantly by the patients who have already suffered from
 stand the bad effects necessary to take special care at the time
 as they perhaps it would otherwise have occurred. Such
 sity to stay in always be strongly advised to have them-
 should always be by a doctor, so that the real cause of the
 as much care as discovered if possible.
 receive it. Many
 a menstrual period.

the early months of **B. STILLBIRTH.**
 day or two and then

this neglect of treatment babies are stillborn (that is, born dead)
 uterus, which carry up to the time of, or during labour,
 rhages, sepsis, and have been saved with proper attention.

labour addition to the danger the mother is exposed to child's eye. abortion, we must keep in mind the loss of life is the chief community. It is not possible to obtain exact carefully after this matter, but it is obvious that thousands place and is untold are lost yearly in this way.

majority of cases of abortion may be classified as follows:—
to gonorrheal infection.

Between them the two conditions of the mother and foetus are the most frequent causes of the uterus. Pregnancy does

Tuberculosis perhaps comes in a retroverted or prolapsed two preceding diseases in conditions favour abortion.

There are two main reasons for formation of the inner coat mildly infectious disease. It is frequent cause of abortion. children in the same way as syphilis the uterus also cause it. inherit the predisposition to tubercle an old inflammation, tubercular parents are more likely to prevent free growth children of healthy parents, even if

from their parents from birth, and so the ovum, of which infection from them. In the second it.

patients stand pregnancy very badly. mother may have one healthy child, an second child, but she is unlikely to recover physical exert pregnancies. Such patients must be fully the ovum from risk to themselves and to their children, a pregnancy, or by should be made to see that they get proper data later on. A Health Visitor may advise one or two essences; it is not per- Fresh air and sunlight, which are absolutely about.

It should be explained how these help in ease. 2. Rest as long as there is any nourishment. 4. Collection and discharge heart disease, kidney to prevent spread of infection. (For These causes, it will children see page 123.) us or neighbouring

The Prevention of Abortion.

We have already seen how much can be done by regular examination of the pregnant woman to keep her in good health and prevent the occurrence of difficulty in labour. The same holds good with the prevention of abortion. If patients were examined by a doctor when they became pregnant and at regular intervals subsequently, such conditions as displacement of the uterus could be treated so that they would not give rise to abortion. Similarly patients could be given advice as to how to safeguard themselves during pregnancy to avoid risks which might otherwise end with the loss of the child. That is, they could be properly instructed as to the hygiene of pregnancy. If all pelvic troubles were adequately treated, abortion would be much less frequent. This refers not merely to displacements of the uterus, but to conditions such as endometritis. In regular examinations of this kind, systemic causes, as mentioned above, would be discovered, and could be treated. Among them the treatment of syphilis is specially important. With patients who have already suffered from abortions, it is necessary to take special care at the time when the period would otherwise have occurred. Such patients should always be strongly advised to have themselves examined by a doctor, so that the real cause of the abortion may be discovered if possible.

B. STILLBIRTH.

A great many babies are stillborn (that is, born dead) when they were alive up to the time of, or during labour, who could easily have been saved with proper attention.

Not only does the mother suffer much needless bodily and mental pain when this is the case, but again there is a great deal of life uselessly lost to the community.

The Causes of Stillbirth.

Placenta prævia and accidental hæmorrhage usually result in the death of the child in the uterus. This is of course because the blood supply is cut off from the child through detachment of the placenta. Pressure on the cord, by its prolapse, or tearing of the cord through its being too short, or through wrong manipulation, act in the same way, *i.e.*, the child is deprived of the supply of oxygenated blood before it is in a position to breathe. Early rupture of the membranes, and a prolonged second stage of labour, causes the death of the child, because the uterine muscle then presses directly on the child, and the strong contractions hinder the flow of the blood in the uterine vessels. The membranes are often deliberately ruptured by an ignorant or unscrupulous midwife, sometimes with the idea that she is helping on the labour, and often to persuade the patient and her relatives that the labour is progressing. A prolonged second stage may be due to a variety of causes, among them a contracted pelvis, transverse position, insufficient pains. Pressure on the child's head, which may be due to a contracted pelvis or to the application of forceps, likewise causes the death of the child. Eclampsia in the mother causes death through the prolonged fits leading to a stoppage in the circulation. Obstetrical operations of various kinds necessarily often cause the death of the child by their very nature, *e.g.*, perforation, craniotomy. Others, such as version, the application of forceps, and Caesarean section involve a certain amount of risk to the child.

Prevention of Stillbirth.

A great many of these conditions are preventible, and if proper action were taken the life of the child would be spared. If the patient were seen beforehand by a properly qualified doctor or nurse, such conditions as contracted pelvis, incorrect presentation, albuminuria, etc., would be discovered in time to take the necessary action. If a skilled midwife or a qualified doctor were present at the confinement, unnecessary rupture of the membranes would also not occur, and even conditions such as placenta praevia and prolapse of the cord would not so frequently end fatally for the child. In order, therefore, to prevent the occurrence of stillbirth, we must try to secure that every pregnant woman makes proper provision for her confinement, and that unqualified midwives are not allowed to practise.

In a few cases, of course, the sacrifice of the child's life is necessary in order to preserve that of the mother, when both would otherwise perish.

VII. THE PREPARATIONS FOR CHILDBIRTH.

In a great many homes in India no provision is made for the coming infant, nor for the mother during and after labour. This is due partly to habit, partly to superstition, and in some cases to poverty and ignorance. It is however very desirable that mothers should learn to make preparations both for themselves and for their expected baby. The training of them in this would be a good deal easier if there were means of keeping in touch with expectant mothers during the period of pregnancy.

THE DATE OF LABOUR.

The majority of patients know approximately when the delivery may be expected. Occasionally there may be trouble if a patient has become pregnant while lactating, but the doctor can generally help her to ascertain the date in that case.

PROVISION FOR MEDICAL ATTENDANCE.

This is seldom made. The doctor or nurse is most often summoned after the labour has already begun. This is very unsatisfactory. At the last moment it may be difficult to secure a properly trained midwife, and in any case it is much better if both nurse and doctor can see the patient before the labour commences. We have already given several urgent medical reasons why this

is so, and in addition there are more personal ones. The doctor and nurse, especially the latter, get to know the patient beforehand, and the patient feels more confidence if she knows them. Patients should always be urged to engage a midwife for the confinement some time before. It is preferable for a doctor also to see the patient, even if she is not actually required at the time of the delivery. If the patient chooses the alternative of going to a hospital for the confinement, she should go there for examination beforehand, and inform the staff of her intention. For those who have little room in the house and cannot afford to make proper preparations, it is much better to go to a hospital. The patient will receive better attention, and it is also easier for the doctor and nurse. Further, the stay of at least ten days, which is usually enforced in hospital, is very good for the patient, as it means rest and freedom from household cares for that period. The baby is also well cared for.

PREPARATIONS FOR THE MOTHER.

The nature of these depends somewhat on the social condition of the patient. If she is well-to-do, she may be able to purchase the things required, and the nurse or Health Visitor can advise her in this matter. The following things are suggested if the patient is to be nursed at home.

1. A large waterproof sheet to protect the bedding.
2. Two large absorbent pads ("accouchement sheets") for the time of delivery.
3. Absorbent cotton for sponges. This can be bought ready prepared, and that made in India is not very expensive. It can be prepared at home from ordinary

cotton, by soaking in a solution of bicarbonate of soda, and then boiling.

4. Cotton-wool pads or sanitary towels.
5. A bed pan.
6. Soap and a new clean nail brush for the doctor and nurse.
7. Some antiseptic, *e.g.*, lysol (a 10 oz. bottle).
8. Three enamel basins, to hold sponges, etc.
9. A bucket or pail.

A few other things, such as an enema syringe, a douchecan, and a thermometer can be provided if the patient likes, but the nurse usually has her own. Clean sheets, clothes and towels are of course necessary, and a new mattress is advisable if the old one is at all soiled.

If the patient is not well off and yet wishes to be confined at her own house, she may be helped towards getting the things, or else she may procure one of the "maternity outfits" supplied by the Victoria Memorial Scholarships Fund. The large pads, absorbent pads and sponges are contained in it, in addition to several things required for the baby. The nurse may supply the soap, etc.

PREPARATIONS FOR THE INFANT.

The following articles, will be necessary:—

1. Some soft warm stuff in which to receive and wrap the child, *e.g.*, an old piece of blanket.
2. Linen thread or tape, sterilized, for the cord, and cord dressing.
3. Sponges for the baby's eyes.
4. Boracic lotion for the same.

5. Clothes and napkins.

6. Small bath and cot.

PREPARATION OF THE ROOM.

In houses where there is more than one room, an airy sunny room should be chosen for the confinement. The dark, hinder room of the house is very unsuitable. Unfortunately there is often little choice. The room should be whitewashed if this has not been done recently. It should be thoroughly clean, and the furniture should also be cleaned. All unnecessary articles of furniture should be removed from the room. If the bed is made with *navar* (webbing), this should be removed and washed before the confinement. String beds can be disinfected and dried in the sun.

VIII. THE CARE OF THE LYING-IN WOMAN.

The care of the mother after the birth of her baby is very important both for the sake of the mother's health, and also in order that the baby may get the best start in life. Rest and freedom from worry are essential at this time, and this is why it is often best for a woman to be confined in a hospital, if she cannot afford the necessary help in her own home. In a hospital she will not be tempted to get up too soon to attend to household matters, and both she and her child will have the care of skilled nurses for the time of her stay.

INVOLUTION OF THE UTERUS.

For about ten days after the labour the uterus discharges a mixture of blood, serum and shreds of mucus known as the *lochia*. If the labour and the puerperium have been conducted with antiseptic care, the lochia should have no disagreeable smell. The vulva should be covered with sterilized cotton-wool pads or napkins, which should be changed frequently. If the mother is nursing her child the uterus returns to its normal size more quickly than if she is not. The uterus is not completely involuted, or in other words does not return to its former size, till six weeks after pregnancy, but it is again within the pelvis in ten days' time. The heavy weight of the uterus makes it liable to get into wrong positions at

this time. In addition all the supporting ligaments and other structures have been stretched by the pregnancy and the labour, and they must be allowed time to return to their former condition before any strain is put upon them. This is why women after labour must be careful for some weeks not to lift heavy weights nor to do much stooping, nor perform work which is tiring. In India patients are very apt not to take this necessary care, and the result is that prolapse and retroversion of the uterus are exceedingly common. These latter conditions involve in the future, months of misery and ill-health, which could have been avoided by a few weeks' care immediately after delivery. It is not necessary that the lying-in woman should have a prolonged rest in bed to avoid displacements of the uterus. Sitting up indeed is good for the uterus, for it helps to drain it of the *lochia*. And mild exercise can be begun in ten days after the confinement. The muscles have to regain their tone, but this is done by massage and wise exercise rather than by over exertion and strain.

THE BOWELS.

Lying-in women are rather apt to become constipated owing to the stay in bed. A dose of castor oil is usually given 36 to 48 hours after the labour is over. This is of benefit, but its effect is of course only temporary. The patient should not be allowed to become constipated. She may be given enemas, or laxatives; saline purges are not advisable for nursing mothers. On the other hand, if the baby has died or the mother for some reason is not nursing, a saline purgative is very useful. Attention to the diet and drinking plenty of water will help to keep the bowels active. (Haemorrhoids, or piles, which

are frequently troublesome in the latter months of pregnancy, usually disappear after the uterus is emptied.

DIET OF THE NURSING MOTHER.

The patient should quickly return to her normal diet if there are no indications of ill-health. For the first two or three days the diet should be light, after that she may eat ordinary digestible food. In some cases in India it is the habit to keep the mother on low diet for some days after delivery. This is quite wrong. The dietary should include vegetables, fruit and milk. Extra water in the morning and at night is good both for the sake of the bowels, and because of the extra drain occasioned by nursing on the fluid of the body.

THE BREASTS AND NURSING.

The baby is put to the breast twelve hours or sooner after birth. The full secretion of milk does not begin immediately after the birth of the child. It is established in a few days' time and the amount secreted is often excessive at first as the baby is not yet taking the full quantity. This may cause a good deal of pain to the mother the breast becoming very swollen with milk, which comes away with difficulty. When this is the case, the mother may be given a saline purge, and the breasts themselves may be treated with hot fomentations frequently changed. Massage of the breast will help in drawing out the milk, or a breast pump may be used. The baby must be applied regularly to the breast, and he will soon learn to suck vigorously.

The majority of Indian women take it as a matter of course that they are to nurse their children. It is often

necessary, however, to teach them the proper care of the breasts, and the regulation of breast feeding.

The breasts must be kept scrupulously clean. They must be washed carefully with warm water and soap at the daily bath. Before and after each nursing the nipples should be washed with boiled water, and then thoroughly dried. The clothing which lies over the breast must be perfectly clean, indeed it is better to protect the nipple with a piece of sterile gauze or clean old linen. If the nipples are at all depressed, they should be made to stand out with massage, and by bathing them with cold water. The latter is good also if the breast leaks much in between feeds. Cracks or fissures sometimes appear on the nipple, and are very painful. They can be avoided to a large extent if proper care is taken of the breasts. They are frequently due to not drying the nipple properly after washing, or to not keeping the breast perfectly clean. Leaking nipples also help to cause cracks because they keep the nipple moist, and because the milk secreted dries on the breast and gets stale and sour. When cracks occur the nipple should be washed with boric lotion. The nipple must be washed free of the lotion before the baby is applied to the breast. A little compound tincture of benzoin applied to the cracks will help them to heal up, or some healing ointment may be used. If the crack is very painful the baby may suck through a nipple shield for a few days till it is healed.

Abscess of the breast is a very painful condition. It is nearly always preventible with proper care. It arises from an infection which is carried into the gland through cracks or excoriations, or through decomposition of milk which has been allowed to dry on the nipple.

Hence the need for strict cleanliness of the nipple and the avoidance of anything which would give rise to cracks. If there are any symptoms of breast abscess threatening, such as pain in the breast, redness and swelling, the case should be shown to a doctor at once. Prompt treatment may prevent the formation of an abscess.

The baby must be put to the breast at absolutely regular intervals and feeds should not be given between the stated hours. The regular emptying of the breasts by the infant is the most powerful stimulus to the secretion of milk. Irregularity often means that the secretion diminishes and the mother is not able to suckle the infant properly. If the baby is allowed to suck at any time, the breast is never properly emptied, and in addition it is not allowed a sufficient time of rest between the feeds, and so cannot secrete the proper amount of milk. The latter part of a breast feed of milk contains a high percentage of fat. If this is left in the breast, the child gets it at the beginning of the next feed, and dyspepsia results. The baby should be allowed to suck for fifteen to twenty minutes. This is quite sufficient for a healthy baby. The baby should not be allowed to lie and sleep with the nipple in his mouth. This keeps the nipple wet, and softens the tissues, making them less resistant to cracks, etc. During nursing, the baby should lie on his side along the arm corresponding to the breast from which he is being fed. It adds to the comfort of the mother if the arm on which the baby is resting is supported by a pillow. The mother's free arm supports the breast. The first and second fingers are placed on either side of the nipple; by this means the flow of milk can be regulated through pressure of the fingers. This prevents the baby taking the milk too fast and so getting colic,

a thing which is apt to happen with healthy hungry babies. (For further details about breast feeding, see page 76.)

It sometimes happens that the mother's milk is insufficient in amount, or that it is poor in one of the necessary constituents. The baby as a result does not flourish, he does not gain in weight, and is constantly fretful because he is not satisfied. The cause of such a deficiency in either quality or quantity of milk is generally one of the following:—

1. Too poor a diet for the mother. The milk at first retains its quality to the detriment of the mother's own health, but the quality of the milk eventually suffers also.

2. Too much work, or insufficient rest. This seems to have a decided effect in stopping the milk supply.

3. Worry and other psychic causes. This is one reason why we wish the time immediately after the birth of the child to be quiet and restful. The fear that she may not be able to nurse her child properly actually hinders some women from being able to do so.

In a few cases it seems impossible to determine what is the cause of the lack of secretion and the patient seems normal and healthy. Such patients should not immediately give up the attempt to nurse.

The remedies are:—

1. Better feeding in the first place. Recently it has been shown that to increase the quantity of milk additional fats are not required so much as a diet richer in protein. Extra fats may increase the fat in the milk, but they decrease the total amount of milk secreted. Extra protein can be given in the form of meat, fish and egg where the patient is not a vegetarian, and as

peas, beans and dal (lentils), if she is. Milk is of value; it should preferably be given as part of a meal except where only two meals a day are taken, when it may also be given separately morning and evening. Milk used with cocoa is very nourishing. Corn meal made into a gruel is said to be good for helping the flow of milk. The patient should also increase the amount of liquid taken and extra water should be drunk between meals for this purpose. There are various medicines on the market which are advertised to increase the secretion of milk, but it is better to try other means first, and certainly, it is not well to rely on drugs only. Sometimes a tonic will be needed in order to induce an appetite so that more food can be taken.

2. More rest may be needed by the patient. Early getting up after confinement may dry up the milk supply. The patient should not neglect to take exercise, but she should have a good night's sleep, and a midday rest.

3. Avoidance of worry. This has been already emphasised. Patients should live a quiet calm life. This of course does not mean that they should be idle.

Massage of the breasts and sponging with hot and cold water alternately also promotes the secretion of milk.

Nursing mothers should be very careful as to what medicines they take during lactation. Certain drugs are excreted by the breasts and may affect the child. A nursing mother should not take any medicine except with a doctor's advice.

SITTING UP.

Patients should sit up on the fifth day, and gradually get out of bed, commencing on the tenth day. From

the beginning the patient should be as much as possible in the open air. During the time the patient is in bed, massage will help to keep up the tone of her muscles, and if everything is normal she should increase the amount of her walking every day after she is allowed to get up.

IX. THE CARE OF THE NEWLY BORN INFANT.

After the cord has been tied and cut, the baby is wrapped in a piece of warm cloth and placed on one side in a warm safe place while the nurse attends to the mother. She should look at the baby however, every now and then to see that he is breathing properly, and that there is no hæmorrhage from the cord. If the baby has cried properly immediately after birth, there is little fear that he will not continue to breathe normally. If he becomes blue and feels cold, he must be attended to at once. He can be laid in his own bed surrounded by properly protected hot water bottles. If the cord is bleeding it must be retied with sterilized linen thread or tape.

After the mother has been attended to the baby's bath is first given. As the skin is usually covered, in parts at least, with the greasy substance known as *vernix caseosa*, the baby should first of all be well rubbed all over with warm olive oil. The surplus oil may be wiped off with a piece of absorbent cotton wool, and then the baby is bathed with soap and warm water. The temperature of the water should be 100°F. The bathing should be done in a warm place and should not take too long in case the baby gets chilled. The drying should be very carefully done, special care being given to all the folds of the skin. The cord is next dressed. Two pieces of lint or double gauze four inches square are needed,

and a hole is made through the centre of each. The cord is drawn through the hole, and is then well powdered with a powder containing equal parts of boracic acid, zinc oxide and starch. The gauze or lint is then folded over the stump of the cord, and a thin bandage is applied, which is wound several times round the abdomen. The eyes have usually been wiped with boracic acid solution immediately after the baby's birth. At the time of the bath they can be attended to again, if any mucus remains about them, and in addition a drop of a 10% solution of argyrol or protargol should be dropped into each eye. The reason for doing this is the danger that the baby's eyes may have been infected during the passage through the birth canal if the mother has suffered from gonorrhœa. Argyrol in this strength does absolutely no harm to the eye, and as gonorrhœa is exceedingly common, it is as well to take this precautionary measure, even if we have no evidence that a gonorrhœal infection is present. The clothes and napkin are then put on, and the child is ready to be put in his own bed.

While the bathing and dressing processes are going on, we are able to examine the baby to see that there are no injuries or abnormalities present. The baby will perhaps pass both urine and meconium at this time, so that we know that the openings of the urethra and anus are normal. The foreskin should be examined to see that it is not too tight, and it should be gently drawn backwards, and the parts cleansed. It may not be possible to uncover the whole glans at the first bathing. The child will probably cry lustily during the bathing and dressing, but this does him no harm.

The baby should be placed in his own cot at once, and not with his mother. If he needs extra warmth it

can be supplied in the shape of hot water bottles. The cot should be put in a warm place, but at the same time there must be plenty of air. Too much light should not reach the baby's eyes at first. The eyes of the newly born infant are sensitive to light, and a shade is necessary.

The baby must be put to the breast not later than twelve hours after birth. Many people advocate putting him to the breast shortly after birth. The sucking of the infant promotes uterine contractions and is useful for this reason alone. He should be fed three times in the first twenty-four hours, and after that regular three hourly feedings may begin, except of course at night, when the baby should not be given the breast at all. He can be given boiled water to drink if he wakes and cries. For the first few days, till the milk supply is properly established, and the baby has learned to suck, the length of the feed will be short. When the milk flow is established, the baby will suck for fifteen to twenty minutes. At first he should suck from both breasts at one feeding time. Later he should suck from alternate breasts.

The dressing of the cord has to be repeated daily till it comes off, *i.e.*, on the fifth to the seventh day.

Meconium is passed by the baby for the first few days after birth, and then gives place to the soft, yellow stools of the normal infant.

Fresh air is good for the baby from the very start of life. If he is warmly wrapped up in bed, even cool air will do him no harm whatever, but rather strengthen him and give him vigour and a good appetite. The cot may be placed on the verandah in a sheltered place after a very few days. The head must be shaded from too bright a light for the reason already mentioned, but air must not be excluded along with light.

X. CAUSES AND PREVENTION OF PUERPERAL SEPSIS.

The greatest care of the patient during pregnancy will not help us to preserve her life unless we pay the most scrupulous attention to the highly important subject of sepsis and its prevention. We have laid stress on the general importance of cleanliness, but the matter is vital when it comes to the time of labour and the puerperium. The number of deaths from puerperal sepsis is very high in India, and it should be remembered that in addition to death a great deal of ill-health is brought about by sepsis, even when the patient survives.

THE CAUSES OF PUERPERAL INFECTION.

The actual cause of sepsis is found in the presence of micro-organisms of various kinds which invade the birth canal, and cause inflammation and pus formation. The birth canal in its normal state is sterile, that is free from such organisms. They are therefore introduced from without. We have already seen the kind of atmosphere and surroundings in which they are likely to flourish. The more unhygienic the surroundings are through the want of cleanliness, fresh air and sunshine, the more likely is it that organisms are present. We may group the means by which infection is likely to take place into three classes:—

1. Sources of infection in the patient herself.

2. Sources of infection in the midwife attending the case.

3. Sources of infection in the surroundings.

1. With regard to the patient herself, there may be personal lack of cleanliness. She may not bathe sufficiently often or in the proper way, and she may neglect to bathe the region of the vulva especially before confinement. Her clothes may be dirty, also the bed and bedding. Her habits may be dirty, or custom may prevent her from leaving the room to pass water and empty the bowels. If the patient is herself dirty either in person, clothing, or bedding, it is not easy for the doctor or nurse to prevent sepsis as they must necessarily touch both her and her clothes. Another source of danger in the patient herself is the presence of an old infection with gonorrhœa, which as we have already seen may be stimulated afresh by a confinement. In that case the organisms are actually in the birth canal before the labour commences although dormant. It is probable also that infection may take place from the intestinal canal, not merely from the anus, but through the tissues.

2. The attending *dai* or midwife may infect the patient in a variety of ways. In India the fact that the majority of confinements are carried out by ignorant, untrained *dais* enormously increases the risk of sepsis during labour. The greatest number of deaths from puerperal fever are probably due to direct infection at the hands of such untrained midwives.

The *dai's* hands may be dirty; they usually are. With these dirty hands she proceeds to make a vaginal examination, in fact she is seldom content with one examination but makes several, at all stages of the labour.

If she thinks fit she will introduce her hand as far into the uterus as she can. Sometimes she may wash her hands in a superficial manner, but she does not understand how thoroughly this needs to be done. It is a regrettable fact even properly trained midwives are often careless in this respect. The clothes of the *dai* are often dirty, so that even if her hands are clean, her dirty clothes touch the bedding and the patient, or she re-infects her own hands after washing them. Frequently we find *dais* wearing bangles of silver or glass which they cannot take off and which are by no means sterile. The *dai* is not supposed to use instruments of any kind, but for all that ignorant and unscrupulous women often do so, and of course such instruments are never sterilized. A pair of dirty scissors or other instrument can be used to rupture the membranes. Plugs made of dirty wool or rags may be introduced into the vagina. Medicines are also introduced into the vagina which are not sterile, and they are sometimes mixed with earth, with the result that tetanus may follow. A properly trained nurse may infect a patient if she uses an instrument, *e.g.*, a nozzle, which is not sterile. The work and habits of the *dai* do not help her to keep clean. This is not always her own fault, for she is expected to do all sorts of other work in addition to her actual work of confining the patient. After the labour is over she is expected to bury the placenta, to clean up the floor, which may involve the use of cowdung and earth, and to wash the dirty clothes. After this she may re-examine the patient and even the merest touch on the vulva or napkin is of course dangerous after such work. The *dai* frequently attends a case of puerperal fever, and then immediately goes to a new case. As she does not understand the processes by which infection is carried, she has no hesi-

tation in doing so. This would be a most serious offence in a trained midwife.

3. The surroundings in which the patient is confined may also be a source of infection. We have already mentioned the preparations which should be made in this respect for the patient. What we too often find however, is that the room is dark and airless, the walls dirty, the corners full of cobwebs where dust lodges. The floor is very often only of mud which is difficult to keep clean and free of dust. The walls may also be only of mud, and even if they are whitewashed it is not considered necessary to have this freshly done before the confinement. The furniture of the room may be dusty and dirty, and unnecessary articles are left to lie about, bundles of bedding, etc.

The more remote surroundings may also be unhygienic. The house may be in an unfavourable situation, in a crowded bazaar, or near an open drain. More often than not the drainage of the house itself is faulty, and the latrine may be placed in an unsuitable position, as for example in Mohammedan houses where strict purdah is observed. The water supply is only too frequently defective: sometimes the water has to be fetched from a pump or well at some distance from the house, and this makes cleanliness much more difficult.

The majority of the causes which have been mentioned as producing sepsis during the labour, also operate during the puerperium, that is, after the actual confinement is over. A patient needs as great care during the puerperium as in the labour itself. All the care that has been taken during the confinement to avoid sepsis must be continued after the baby is born. We have only to reflect on the condition of the inside of the uterus to see

why this must be so. The whole of the interior of the uterus, especially the placental site, is like a large raw wound, which offers a splendid breeding ground for germs. We must therefore carefully avoid anything by which such germs could be introduced into the uterus.

It must also be remembered that we have not only to prevent germs from reaching the vagina or uterus, but strengthen the patient's resistance to combat such infection if it should arise. A patient in a weak condition is much more likely to become infected and to succumb to infection than if she were strong and healthy. Want of nourishing food, hæmorrhages, prolonged pain, all help to lower the patient's resistance. We should endeavour both before and after the confinement to keep our patients in the best possible health, and we have already studied how that is to be done.

PREVENTION OF PUERPERAL SEPSIS.

With regard to the patient herself, scrupulous attention to cleanliness must be enforced before, during and after the confinement. The vulva is thoroughly cleansed every day with soap and water and an antiseptic. In addition it should be washed with antiseptic lotion each time the patient passes urine or faeces, or the napkin is changed. The napkins should be sterile. The patient's clothes and bedding must be clean, and changed at once if they become soiled. The excreta should be passed into a bedpan which must be kept thoroughly clean.

2. The midwife attending the case must be exceedingly careful. She must be properly trained, and must obey all the rules of her profession with regard to the prevention of sepsis, etc. She must wash her own hands

before touching the vulva, or making an examination or changing the napkin. She must have clean clothes, she must not wear rings or bangles, she must roll up her sleeves properly out of the way. She must use no medicines or plugs except under a doctor's orders. She must not attend other cases after having been at a septic case, nor must she engage in any sort of dirty work such as cleaning the floor.

3. The surroundings should be thoroughly hygienic, that is there should be abundance of light, air and sunshine; no open drains, dirty rubbish, or unnecessary furniture; and soiled clothes or rags must not be allowed to lie about. The room should be whitewashed before the confinement.

PART TWO.
INFANT WELFARE.

SECTION I.

HEALTHY BABIES.

I. GENERAL DEVELOPMENT OF THE NORMAL BABY.

The healthy baby has a soft, delicate skin, covered at first with a fleecy down, especially on the head and back. This is shed in three to four months when real hair makes its appearance. The infant is born with a varying amount of subcutaneous fat which, if he prospers, is laid down in increasing degree, giving us the rounded limbs of a normal baby. In extreme infancy, the greater part of the twenty-four hours is spent in sleep. Healthy babies do not cry much if they are properly trained. The strength of a baby's cry gives us some indication of the strength of the baby. It is important to notice the cry of an infant, as it can inform us of several diseased conditions. A moderate amount of crying is normal in a baby, and it is not bad for him as it exercises both his muscles and his lungs. The baby should not cry too much, however, and the mother should always be certain that the cry is not due to pain or other abnormal cause. The ordinary cry of a healthy baby is loud. The baby may cry because he is hungry or thirsty, or because he is uncomfortable through a wet

napkin, or because the clothes are too tight, etc., etc. The baby should never be fed merely because he cries if the feed is not due. The spoilt baby will cry to be taken up. This also should certainly not be yielded to.

The baby's movements are feeble at first and his muscles flabby. Gradually he begins to exercise his muscles in the familiar ways of kicking and waving his arms, till these are replaced in their turn by the activities of a crawling and walking child.

WEIGHT.

An average Indian baby weighs about $6\frac{1}{2}$ lbs. at birth. He loses weight during the first three days of life. From this time onwards there should be a steady gain in weight, averaging 5-7 ozs. a week, up to five or six months, and then slightly less. The weight should have doubled itself at the beginning of the fifth month, and be about three times as much as at birth at the end of the first year, that is about 20lbs. The weighing of infants is one of the most important activities of a baby clinic. The reason for this is that steady increase in weight is one of the best means of telling whether the baby is flourishing or not. Weighing is valuable for healthy babies and necessary for delicate ones. The weighing should be done weekly for the first six months, every two weeks the second six, and monthly the second year. It is best to keep the record of weighings in the form of a chart. This should always be done when babies come regularly to a baby clinic. Intelligent mothers can learn how to keep the weight chart at home. For weighing, an ordinary scale, which will weigh accurately to $\frac{1}{2}$ oz., should be used. Spring balancers should not be used as they lose their accuracy.

HEIGHT.

The infant also shows a progressive increase in length. This is likewise an indication as to whether the child is in good health or not, though not so important as increase in weight. The length of the average child at birth is 19½-20 inches. The child grows 4-5 inches in the first six months, and 3-4 inches in the second six months. The increase in length after that is slower.

It should be remembered that the proportions of infants differ considerably from those of adults. The limbs are short compared with the trunk, and the circumference of the head and abdomen are large compared with those of an adult.

The *fontanelles*, or the points at which the bones of the head meet, are open at birth. The posterior one closes by the end of the second month, the anterior about the eighteenth month. If it is not closed by the end of the second year, an abnormal condition is usually present.

THE TEETH.

The order of the appearance of the teeth is usually as follows:—

Lower central incisors 6-9 months.
Upper central and lateral incisors ...	8-12 months.
Lower lateral incisors and anterior molars 12-14 months.
Canines 18-22 months.
Posterior molars 24-30 months.

Although these are the average times of appearance, there are wide variations from them which yet do not

indicate that the child's health is not good. The cutting of the teeth is usually accompanied with some pain, and this may cause the child to cry and be out of sorts. Teething is by no means invariably accompanied by ill-health, as is frequently supposed. The order in which the teeth appear is as important as the time of appearance. Irregularity in this, and the appearance of teeth singly, are frequently signs of rickets.

II. GENERAL CARE OF THE BABY.

The principles of general hygiene which have already been studied apply, of course, to the bringing up of a baby. It is obvious that if we wish the mother to live in hygienic surroundings for the sake of her unborn child, we must be just as careful to secure the same atmosphere for the baby from the earliest days after its birth.

FRESH AIR.

This is of the utmost importance. It is extremely difficult to secure in a crowded bazaar, but it is not always given when available. Babies in India are not often shut up in stuffy rooms during the day, it is true, but they are frequently carried under a *chaddar* in the mother's arms so that the air does not reach them. Then again at night they usually share one bed with their mothers, and the hot air from the mother's body surrounds them instead of the pure cool night air. In winter all possible openings for ventilation are often entirely closed during the night. Exposure to fresh cool air not only does the baby absolutely no harm, as long as he is 'warmly' wrapped up, but actually strengthens him. Babies who live and sleep in the open air do not catch cold readily; they are protected against tuberculosis and other lung diseases. They sleep more soundly and longer, they have good appetites, and thrive

in every way. What has been said with regard to sunshine applies here also. The abundance of sunshine undoubtedly saves many lives in India.

CLEANLINESS.

This, if possible, is even more necessary for children than for adults, if only because their skins are so soft and delicate.

The baby must have a daily bath. The bath should be given in a warm corner of the room if the weather is cold, and everything should be ready in order that the bath can be given quickly and the baby dressed again so as to prevent him getting chilled. The bath should be of a size suited to the infant. The temperature of the water should be about 98°F., and it should be tested with a thermometer if possible. All the folds of the skin should be washed and dried with great care. The drying should be done gently with dabbing movements rather than with much rubbing at first. If drying is carefully done powder is unnecessary.*

The daily bath is usually given in the morning. In the evening the hands and face may be sponged. The baby must never be allowed to remain dirty. If he passes a stool in the napkin, it must be removed as soon as discovered, and the buttocks washed and dried.

The eyes should be washed for the first few days after birth with boric acid solution.

There is no need to wash or wipe out the mouth of a healthy baby. The saliva washes it sufficiently, and

*In the hot weather when there is profuse perspiration, the use of powder is necessary, and adds greatly to the baby's comfort; but its employment after the bath tends to be overdone by many mothers and nurses.

wiping, if carelessly done, is apt to injure the mucous membrane. When the child has cut a number of teeth, the care of the teeth may begin with the use of a small brush, or tooth-stick. More important than this, however, for the preservation of the teeth, is the proper selection of foods (see later).

In boy babies the foreskin should be drawn back daily at first, and the part washed. There may be difficulty in drawing back the foreskin the first day or two, but if the attempt is made daily it will usually succeed in a short time. If not, circumcision may be necessary, and the baby should at any rate be examined by a doctor.

Delicate babies or premature infants may have an oil bath until they are strong enough for an ordinary one. Ordinary sweet oil is used, which is warmed and applied with cotton wool. When the child is stronger, sponging may be substituted, that is, the baby is washed on a towel on the mother's lap, till finally he can stand the full bath. When the baby gets older, cold sponging is very healthful. It should always be followed by exercise, and should be stopped if the child does not react, *i.e.*, if he shivers and is blue instead of becoming invigorated and red.

ACTION OF THE BOWELS.

It is very important to start training the baby at once to have regular action of the bowels. It is not so difficult to secure this if the training is begun at once. The habit of allowing the child to empty the bowels into the napkin when he feels inclined is most objectionable. It is dirty, unhygienic, gives more trouble to the mother, and is unnecessary if a little trouble is taken at the start of life. The baby has usually two or three motions daily at first.

These are gradually reduced to one. The baby should be placed on a small chamber held on the mother's lap. The best time is after a meal, and it should always be done the same time of the day (twice a day at first). Babies must never be "held out" in an open space (garden, compound, etc.). This attracts flies, and is altogether most unhygienic. Mothers must be fully instructed as to the objections to this practice and the dangers it involves.

In the same way the baby can be gradually trained to empty the bladder regularly, though this takes a longer time. By the time he is a year old, a well trained baby should be able to do without napkins.

Babies vary very greatly however in the ease with which they are trained in these matters. The mother must not lose patience even if the child seems difficult. Her patience will be rewarded in the end.

CLOTHING.

Warmth is another vital necessity for young babies. In North India the temperature falls considerably during the night even though the sun may be quite hot in the day. In the rains also a big drop of temperature may occur in a few hours. Sudden falls in the temperature are dangerous to infants, for, owing to their helplessness, they can make no provision against them, and they lose heat more quickly than adults because the surface of the body is more extensive in proportion to its size. At the same time the opposite extreme of excessive clothing must be avoided. That is just as bad. Our aim should be to provide clothing that is light as well as warm, that does not hinder the free movements of the limbs; and

which does not irritate the skin. In the hot weather practically no clothing is needed.

The binder is required only as long as the cord needs a dressing; after that it is no longer necessary and even does harm by not permitting of the natural growth in strength of the abdominal muscles, and restricting deep breathing.

The necessary garments for a young baby in North India in winter are:—

1. A vest of flannel or knitted wool.
2. A napkin which is pinned on to the vest.
3. A long warm *kurta* with sleeves.
4. A pair of warm socks or “booties” (see Appendix).

In addition a warm shawl is needed to wrap the baby in when he is taken out of bed, except when he is allowed to lie free to exercise his limbs.

When the teeth begin to come a bib is necessary (see Appendix). As the baby gets older the *kurta* is shortened, and he can begin to wear small pyjamas over the napkin. The child should begin to do without the napkin at about twelve months, or even sooner in hot weather if he is properly trained.

Indian mothers are not in the habit of using napkins for their babies. They have to be instructed as to the advantages of their use, and warned of the dangers of improper use. The advantages are of course cleanliness, hygiene, and convenience. The following instructions may be given as to the use of napkins:—

1. The usual size is 25 inches square, but smaller will do.

2. Material: soft Cawnpore twill is very suitable or a double thickness of butter muslin. Any soft absorbent material will do.

3. The napkin must be removed as soon as it is wet. A wet napkin should never be allowed to stay on a baby. It chills him.

4. Napkins must never be dried and reapplied. They should be placed in cold water at once. Napkins should not be washed with soda as this excoriates the skin.

5. The mother should always wash her hands after touching the soiled napkin.

6. The napkin should not be too bulky. It can be folded so that one thickness only is pinned up between the legs. At night or when the baby is having a long sleep, the napkin need not be pinned up between the legs at all. One fold may be simply drawn through, or else a diamond-shaped pad of clean old linen or cotton wool may be placed between the legs. The advantage of this is that the urine does not spread and chill the baby, and so he does not tend to wake up. Napkins can, however, be changed by skilled hands while the baby sleeps.

THE BED AND BEDDING.

Most babies sleep with their mothers in India, a practice not at all good. The baby does not get the same supply of fresh air as he would in sleeping alone, and there is danger of his being injured. Health Visitors must encourage the practice of the baby sleeping alone in his own cot or cradle. Cradles can be made very cheaply by a basket man.* A suitable size to begin with would be $2\frac{1}{2}$ by $1\frac{1}{2}$ ft. Cots can also be made on a

*For about Rs. 3 in Delhi.

wooden frame with sacking or canvas. For the wooden part an old crate may even be used. Old-fashioned swinging or rocking cots or cradles should not be allowed, as they train the baby to require such aids to sleep. Muslin or other curtains are also unnecessary. They collect dust and hinder the free access of fresh air. The mattress should be firm and protected by a piece of waterproof sheeting. The coverings should be light as well as warm; wool is better than cotton, down best of all.

It is unfortunately necessary to cover the cradle with mosquito netting for a good part of the year. It must be well adjusted and without holes. If a mosquito net has to be used, the cradle should be placed where there is some movement of the air, otherwise the baby gets too hot, and does not get enough air.

If it is very cold or the baby is ill or delicate, hot bottles may have to be used to warm the bed. A heated brick is a good substitute within reach of the very poorest. Great care must be taken in the use of hot bottles to see that the baby does not get burnt. The bottle should never be applied directly to the baby's skin, but thickly wrapped up and not in contact with the baby at all.

REST, SLEEP AND EXERCISE.

It is the natural thing for babies to sleep the greater part of the twenty-four hours during the first few weeks of life. They should be put back in the cot after feeding, when they usually at once fall off to sleep. Babies should not be rocked or jogged after a feed. If there is a tendency to bring up wind after the feed, the baby may be held upright for a few minutes resting over the mother's shoulder. Babies should sleep on the side, and the position must be changed every now and then.

As the child grows and his faculties develop, he requires less sleep and more exercise, and also more stimulation for the growing senses. He should, however, always have a long night's sleep, and a midday sleep should also be continued for several years. The baby should be put to bed at the same time every day, both morning and evening, and left to go to sleep alone. Babies should not be patted or sung to sleep. To do so wastes the mother's time and forms a bad habit in the baby. If babies are never patted or sung to sleep they learn to fall asleep at once by themselves and give no trouble in this respect. The muscles of the child are flabby at first; with exercise they develop. The child should be free to kick his limbs about; thus he gradually learns to crawl and walk by imperceptible stages. A "kicking pen" is useful for the child to lie and kick in and later to play in. It can be made quite cheaply out of canvas and wood or wood only, or even out of an inverted *charpai*, and the child cannot roll or crawl into dangerous places.

At first the child is not able to hold his own head up, and it has to be supported. The supporting should not be overdone, however. About the fourth month the baby begins to hold up his own head, and the muscles of the back develop so that at eight months he can sit up alone. At the tenth or eleventh month he tries to stand, at first with help and then alone. Finally he begins to walk at twelve to fifteen months.

The healthy infant *wants* to exercise himself, and to some extent can regulate his own exercise, though at first he should not be allowed to sit up or walk too long when learning these accomplishments. The clothes should be such that they do not hamper free movements. It should be remembered that strong muscles make strong bones;

if the muscles are well developed they act on the bones. It is a fallacy that early walking causes bandy legs. The bones of the legs have a natural curve due to the child's position in the uterus, and the muscles straighten them.

A word may be added here as to the use, or rather the misuse, of the "comforter" or dummy teat. Such an article should find no place in the baby's equipment, yet its use is becoming more common daily. Health Visitors must use all their influence to stop this habit. The comforter is usually given to quieten the baby. As we shall see later (page 118) its constant use tends to cause adenoids and to prevent the proper development of the jaws and mouth. Apart from this it is highly dangerous. It falls out of the baby's mouth and is picked up again and re-inserted with, at most, a casual wipe. Thus micro-organisms are conveyed directly into the baby's mouth. The constant sucking of the teat induces a corresponding flow of saliva which is bad for the digestion. Sometimes the dummy is dipped in milk, *gur*, or other substances which are thus given to the baby at an unsuitable age. Once the child learns to go to sleep only with the aid of the dummy, it is hard to break him of this habit. Babies fall asleep naturally when in good health and when they have been properly trained, and no comforter or other device can ever be a substitute for good health or good habits.

The giving of small pellets of opium to babies to keep them quiet is every bit as harmful. This is commonly done by mothers who have to work, but also by others who have less excuse. It is a most injurious habit, it causes the baby to be constipated and stupid, to be irregular as regards times of sleep and food, and is altogether most unnatural.

III. FEEDING OF THE BABY.

The great majority of Indian mothers take it for granted they can and will suckle their infants. Indeed the difficulty is rather to make them leave off doing so! We only very occasionally find that Indian mothers for an insufficient reason refuse to nurse their children. It is of course very satisfactory that this is so. A mother should never be advised not to nurse her child, unless for a good reason. Mother's milk is the best food for infants, and no substitute is as satisfactory. It should be remembered that slight fever, or even a breast abscess, does not mean that the mother cannot nurse. If the milk supply does not start at once the attempt should not be given up. Perseverance and suitable diet will often induce a supply after a time, and the efforts of the infant to suck are a great stimulus to milk production.

Mothers who should not suckle their children are those suffering from tuberculosis, profound anaemia, acute infectious diseases, syphilis contracted after delivery, heart disease with symptoms, kidney disease, breast abscess in certain cases, and nervous exhaustion. If possible, the opinion of a doctor should always be taken.

THE BREAST AND LACTATION.

At the time of puberty the breasts begin to enlarge. They stand out firmly from the chest wall; they vary

slightly in size at different times owing to the connection between the breasts and the uterus. When pregnancy takes place they at once begin to enlarge, and become more pendant in shape. The skin covering the nipple and its base is pigmented, and this pigment increases in amount during pregnancy. The skin at the base of the nipple contains sebaceous glands, which enlarge in pregnancy, giving rise to raised spots known as Montgomery's follicles. These glands secrete an oily substance, and the increase of this in pregnancy keeps the skin soft and pliable. The skin becomes striated like that of the abdomen through stretching.

The breast consists of from 15 to 20 lobes of gland tissue, which are separated and supported by fibrous divisions and fat. The large divisions of the lobes are called lobules, which again are made up of smaller divisions called *acini*. The acini are lined with *epithelium* which secretes the milk. The process is as follows. Oil droplets appear in the epithelial cells; they increase in number and run together till finally the cell is so distended that it ruptures, and the oil is discharged into the *lumen* or central space of the acinus. The cells near the centre of the acinus undergo fatty degeneration, and are discharged when lactation first begins. The first milk which appears is called *colostrum*. This substance differs from true milk in that it is richer in protein, and contains these discharged cells which are called colostrum corpuscles. The colostrum probably acts as a laxative to the baby, for the child does not gain in weight at first. It is replaced by true milk in a few days.

The milk from the acini is carried off into small ducts which unite with others till they finally form one large

duct which opens on to the nipple. Each lobe of the gland has one of these ducts.

The breast has a good blood supply, which is increased during pregnancy and lactation, so that the veins become prominent on the surface of the gland at these times.

THE COMPOSITION AND CHEMISTRY OF HUMAN MILK.

Milk is an emulsion, that is, a suspension of minute particles of fat in water. It also contains proteins, carbohydrate in the form of sugar, salts, and substances known as vitamins. Thus it contains all the elements necessary in food. The specific gravity of milk is 1029—1030.

Proteins are substances containing Nitrogen. Other foods rich in proteins are meat, eggs, peas, *dal*.

The proteins of milk are three in number: (1) caseinogen which coagulates with rennin* and is therefore called a coagulable protein, and (2) lactalbumin and (3) lactoglobulin. These last two are called non-coagulable proteins, because they do not coagulate with rennin, though they are coagulable by heat. The non-coagulable proteins form two-thirds of the total proteins in the mother's milk at first. The proteins form 1.5—2.0 per cent. of the milk.

The *fat* in milk is its most variable constituent. It forms from 3.5—4.0 per cent of the total. The globules of fat in human milk are of uniform size.

The *carbohydrate* of milk is lactose or sugar of milk. It is present in the proportion of 6—7 per cent.

*Rennin is the active principle of the substances sold commercially as rennet. It is present in the child's stomach, where it acts as a digestive ferment. The commercial rennet is derived from calves' stomachs.

Carbohydrates and fats are the direct heat-producing factors in food. All starchy foods, *e.g.*, rice, sago, barley, etc., belong to the group of carbohydrates, and also all the sugars. Sugars are soluble carbohydrates. Rice, sago, etc., are insoluble carbohydrates for which the child's digestion is not at first prepared.

Salts or mineral constituents form .2—1.0 per cent.

Vitamines are present in milk in very small quantities. They form, however, a very important constituent. Their nature is as yet not properly understood. They may be of the nature of ferments. It is certain however that their absence is the cause of some diseases, and probably affects in a general way the vital processes of decay and repair known as metabolism.

The total solids of milk thus form from 11.2—14.0 per cent. of the whole, and the water 86.0—88.8 per cent.

The quantity of milk secreted per day increases from about 12—16 oz. in the first week to 40 oz. at the ninth month.

Human milk is perfectly adapted to the needs of the child. The fat of human milk is easily absorbed, the fat globules being small and of even size. The proportions between the two kinds of proteins are adjusted to the digestive capacity of the child. At first, while the digestion is weak, the non-coagulable proteins which are more easily digested than the coagulable, are in excess. Afterwards, as the child's digestion grows stronger, the coagulable protein (caseinogen) increases in amount till it becomes the larger constituent of the two. This caseinogen, when acted upon by the gastric juice of the stomach, forms a curd which is more difficult to digest.

REGULATION OF BREAST-FEEDING.

The whole tendency of modern teaching on infant feeding is to reduce the number of feeds given to the child, and to give *no* feeds during the night. The Health Visitor who preaches such a doctrine in India, has an uphill task before her, but in the interest of the babies she must do her best to get the mothers to adopt this method. It is also in the interest of the mother, as she will come to realise if she consents to try the plan. It is bound up with the questions of training and discipline with which we shall deal later.

The baby must be fed perfectly regularly—"by the clock." If the child cries between feeds, the crying is not necessarily due to hunger. If he is being fed properly, the child will usually, when quite young, sleep till the next feed. Very often a child crying between feeds is thirsty, and should be given plain boiled water. Or else he is wet and therefore uncomfortable, and only needs to have the napkin changed to stop the cry. A baby should never be fed merely because he cries. Yet there is nothing we see more frequently than a woman putting her child to the breast "because he cries." We have seen already (page 43) that the child does not get the proper milk when this is done. In addition his stomach is upset, he does not get enough sleep and rest, and becomes irregular and undisciplined in his habits. It has been conclusively proved that fewer feedings are better both for the mother and the child. Frequent feedings often lead the breast to dry up rather than the reverse.

Up to the fourth month the number of feeds should be six in the twenty-four hours. With strong healthy babies the feeds may be reduced to five even before this age.

The times suggested for the feeds are 6 and 9 A.M., 12 noon, 3, 6, and 10 P.M. Circumstances may alter the actual times of the feeds, it is the intervals between which matter. Babies can easily be trained to sleep from 10 P.M. till 6 A.M., if the training is begun from birth. They may have to have the napkin changed, be turned over, or given water in the night, but need not be fed. The night is meant for sleep both for mother and child. In order to establish the perfect regularity of habits required, the infant must be awakened for his feeds at the proper times. Very many mothers and nurses have the idea that to do so is wrong. The reverse is the case. If we wake the baby for the feed a few times we shall probably not have to go on doing so, as he will wake of his own accord.

In seeking to impress on mothers the advisability of regular feeding at three-hourly intervals, and no night feeds, it is as well to point out the fact that there are numerous advantages for the mother also in this system. If the baby is fed and then put back in his cradle to sleep quietly as he ought, the mother has a more peaceful, less anxious existence; she has a long sleep unbroken at night and more leisure in the daytime.

By the time the fourth month is reached or even sooner, the baby should be reduced to five feeds a day, for example at 6 and 10 A.M., and 2, 6, and 10 P.M.

About the sixth month, when the teeth begin to show signs of coming, the baby may be given a bone to chew, a chicken or chop bone from which practically all the meat has been removed. In vegetarian households *dal* may be given, but it does not provide the hard substance which is good for the gums. A hard crust may be given,

which takes the place of the bone to some extent. Fruit juice may be given from a few months onwards. Orange or grape juice is the best. It should be strained and diluted with twice the quantity of boiled water. Half a teaspoonful may be given at first, and the amount gradually increased.

WEANING.

Weaning should be begun from 9—12 months of age. Most mothers suckle their babies much longer than this, but it becomes too great a strain on the mother. The only reasons for which weaning may be delayed are delicacy in the infant, and the season of the year. It is well to avoid the hot weather and rains for weaning if possible, as these are the times when babies are most apt to suffer if artificially fed, and when it is very difficult to keep cow's milk fresh. Weaning should be carried out gradually, then there is little chance of an upset to the baby. First cow's milk may replace breast milk once a day. Then after a few days two feeds of cow's milk may be given, and so on until weaning is complete. Many babies are fed from a bottle when first weaned. If the child is breast fed for nine months or more, the use of a bottle is unnecessary; the child can be taught to drink from a cup or spoon at once. As bottles are expensive and a source of danger unless kept scrupulously clean, it is well to discourage mothers from their use.

Opinions differ as to the strength of the milk to be given to a child who is being weaned. Some hold that diluted milk is best for the child; others that he can take whole milk at once. A good deal depends of course on the quality of milk. On the whole it is wiser to dilute the milk while the child is being weaned so as to reduce

the risk of a digestive upset. After that the child can be gradually promoted to whole milk if desired. Even after weaning the child needs a considerable quantity of milk, at least two pints (or over a seer) in the twenty-four hours. Gradually, as he takes more solid food, the amount is reduced. If the bottle is used at all, mothers should be careful not to continue its use too long, as it is very difficult to break the child of the bottle habit later on, and sometimes he refuses to take milk in any other way.

After weaning has been accomplished the child can gradually be given more solid food. Rice, barley, oatmeal (*dalya*), suji and sago can all be given. They are best prepared at first in the form of jelly, that is, well boiled and strained. At first they can be strained through muslin, and then through a strainer, till they can be eaten whole (see Appendix). *Dal* is also good. It should be strained through muslin, or rubbed through a sieve at first. *Chapaties* may also gradually be given, as they provide good exercise for the jaws. Fruit should be continued. Apples are very good as they also develop the gums. Vegetables are gradually introduced into the diet: they must be well pulped at first. In the case of non-vegetarians, eggs, fish, chicken and meat can all be gradually given by the end of the second year. Such foods should be boiled or steamed for young children, and not fried.

Expensive patent foods are not needed for healthy children. Most of them have defects which we shall consider later.

The child should eat the solid part of his food first. If he drinks his milk first, he will not take so much trouble

about the remainder of the meal. If he is given the solid part first, he is hungry, there is a good flow of saliva, and his jaws are well exercised. *Chapaties* or toasted bread ("double roti") can be spread with butter or cream. Children should not be given many sweets. They get sufficient carbohydrate in other foods, and as it is necessary to train them to like plain nutritious digestible food, they should not be tempted by being given sweets which they naturally like at once. Sweets should never be given at the beginning of a meal or at bed-time.

The meal times after weaning should be just as regular as the times for breast or bottle-feeding. Scraps or sweets should never be given between meals. Health Visitors must seek to impress upon mothers that to do so is bad in every way for the child, bad for his digestion, and bad for his morals. It is only too common to see children being pacified with a few sweets, a little fruit, gram, etc., between meals. The result is of course that they are not hungry for the next meal and get into irregular habits. Also they learn to like things which are not the best for them, and refuse wholesome food.

WET NURSING.

If for any of the reasons mentioned above, breast-feeding on the part of the mother is impossible, we must look elsewhere for the infant's milk supply. In wet nursing we provide the child with the milk of another woman, which is the nearest approach to the mother's own milk. Though there is this great advantage in wet nursing, yet there are other considerations to be taken into account before we can say that the method is prefer-

able to any other. In choosing a wet nurse the following points must be carefully attended to:—

1. The wet nurse must be healthy, and special care must be taken to ascertain that she is not suffering from either syphilis or tuberculosis in any form.

2. She should also be of good character, as the training of the child will largely fall to her.

3. Her own child must not differ too greatly in age from that of the child she is about to suckle.

4. She must have a good supply of milk. The milk itself can be tested, but the state of the woman's own child will be the best guide in informing us of the quality of her milk.

5. The breast itself should be free from cracks, fissures, etc.

The wet nurse should be treated in the same way as the nursing mother as regards food, rest, etc. She should not be made into a drudge.

Suitable wet nurses are undoubtedly difficult to secure, but in cases of special need every attempt should be made to get one. Such cases are premature infants, or very weak infants who are not thriving on cow's milk.

ARTIFICIAL FEEDING.

Failing the mother's own milk or that of a suitable wet nurse, we must try from other sources to supply the infant with a food as nearly as possible resembling the mother's milk. What is the choice before us? We have the milk of cows, buffaloes, goats, condensed milk, and

dried milks. How do these compare in composition with human milk?

	Human.	Cow.	Goat.	Buffalo.	Condensed.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Fat .	3·5— 4	4·0	4·5	7·47	1·1
Sugar .	6 — 7	4·5	4·0	4·15	5·2
Protein .	1·5— 2·0	3·5	4·5	5·85	·87
Salts .	·2— 1·0	·75	·6	·87	·15
Water .	86·0—88·8	87·0	86·4	81·41	92·16

It can be easily seen that the substitutes cannot be given unmodified if we wish to feed the baby on a diet resembling mother's milk. Buffalo's milk, on account of its large percentage of fat, is not suited for young babies. Goat's milk is better, and both it and cow's milk can be suitably modified for infants. Condensed milk is not a good food. It contains too much sugar and too little protein and fat. It is also lacking in vitamins. Children fed on condensed milk may become fat on it, but they are flabby and liable to diarrhoea and rickets. It is occasionally useful when good cow's milk cannot be obtained, or in travelling. It also sometimes agrees with children who do not digest fat well.

It is as well for the Health Visitor to have some knowledge of the composition and uses of dried milks and proprietary infant foods. There are many of these on the market, and they are being used by the better educated parents, in India, who yet have little idea of their proper uses. Frequently these patent foods are given with the best intentions, but without a corresponding benefit to the children.

*As ordinarily used diluted.

Dried milks are simply milk evaporated so that only the solid constituents remain. As example is "Glaxo." Some babies do very well on it. It is easy to prepare, sterile, and convenient in travelling or in other situations where fresh cow's milk cannot be obtained. If it is used it should always be supplemented with fruit juice, and it is not to be recommended for permanent use if fresh cow's milk can be obtained. Dried milks have this advantage over patent foods that, when water is added, they are much nearer in composition to human milk than are most of the patent foods. In particular the fat, which is mostly lacking in patent foods, is retained.

The *patent foods* for infants, of which there are numerous varieties on the market, resemble one another in composition, and mostly have the same defects. The principal defects are that the carbohydrate is usually much in excess in proportion to the other ingredients, and in addition is often present in the form of unchanged starch, which the young infant cannot assimilate, *e.g.*, in Ridge's Food. In some the carbohydrate is given in a soluble form as maltose (a kind of sugar), *e.g.*, in Malted Milk and Mellin's Food. Occasionally the use of maltose to replace milk sugar (or lactose) has advantages. It is laxative, and after an illness causes rapid increase in weight as soon as it can be borne. It should obviously not be given where there is a tendency to diarrhoea. The other chief disadvantage of patent foods is the small quantity of fat they contain. They also do not supply vitamins, hence their use should always be supplemented by fruit juice. Some of the patent foods are recommended to be used with milk, *e.g.*, Mellin's Food. In that case the deficiency in fat is made up for by the fat of the

milk, and the use of the food is really to supply extra carbohydrate.

Benger's Food is of a slightly different kind. It is really a milk modifier, and is used along with milk. It consists of baked flour and pancreatin. The flour breaks up the curd of the milk, and the pancreatin predigests the milk. It is very useful when the baby is finding it difficult to digest the curd of milk. It must not be used for too long a period however, or else the child's own digestive powers will not be called into use, and will therefore remain weak. The time of pancreatisation can be gradually reduced, so that the milk is less and less predigested and is finally digested wholly by the child.

Turning now to goat's or cow's milk, we must consider the modifications necessary in order to adapt them for the baby's use. First we must obviously reduce the amount of protein, as it is much in excess of that of human milk. On the other hand the percentage of sugar in human milk is higher than that in cow's or goat's milk. If we reduce the protein by simply diluting the milk we shall have to add sugar to the mixture and also fat. The usual method of making cow's milk suitable for babies is therefore to take a fixed proportion of cow's milk and add to it water, sugar of milk, and fat or cream.

If "top milk" is used (that is, the upper portion removed from milk which has been set without boiling to allow the cream to rise), extra cream may not be required. This is seldom possible in India, however, as we shall see presently. Cane sugar may be used instead of sugar of milk if the latter is not available, indeed it is recommended by some authorities. It has also the advantage of cheapness.

“Milk formulae,” that is, details as to the proportions of milk and other ingredients to be given to the baby at various ages, are to be found in all books on children, and in many text-books of midwifery. These are useful as guides, but they must never be followed blindly. It cannot be too strongly emphasised that the feeding of babies cannot be successfully accomplished by the mechanical following out of directions. The nurse or Health Visitor, or the mother if she is sufficiently intelligent, must think out for herself the child's needs, and no two children are exactly alike in what they need. In addition we must take into consideration the quality of the milk we are using. The milk which has been used in the preparation of a certain formula in a book, may be of a widely different quality from that with which we actually have to deal. This is especially the case in India, where milk, as usually supplied, is of a poor quality, particularly with regard to fat. Then again milk in India has almost always to be boiled, and this causes the fat to come rapidly to the top. In feeding a young baby on a mixture of cow's milk, therefore, we have in a sense to experiment on the baby. That is, we may follow a certain formula at first, and observe its effect on the baby by means of accurate regular weighing, the number and appearance of the stools, presence or absence of vomiting, etc.

As the age of the child increases, the composition of the food will also have to be changed. The times of feeding should also be changed, that is reduced, just as in breast-feeding. These two changes should not be carried out simultaneously. The increases in the bulk of the feeds should be small, never more than 1 oz. at a time, and preferably $\frac{1}{2}$ oz.

The stomach of a newly born baby holds one ounce. We therefore give him a feed of this amount to begin with. The amount is however quickly increased, so that at the end of ten days the baby usually takes 3 oz., and at the beginning of the second month $4\frac{1}{2}$ oz. (*N.B.* This is based on the calculation that the baby receives six feeds in the twenty-four hours. For delicate babies who require more frequent feeding, the quantities would of course be less.)

How shall we prepare a bottle for a baby of one week old? We may prepare several feeds at one time and keep the mixture, giving the required quantity at the stated intervals. This saves labour, and the milk can be prepared in two lots, say four feeds for the daytime from the morning milk, and the 10 P.M. and 6 A.M. feeds from the evening milk. Then all we have to do when giving the feed will be to heat the required quantity of milk to the right temperature at the proper time. This method of preparing several feeds at one time is only safe however if the milk can be kept really cool. Ice will be necessary when the weather becomes at all hot. Otherwise it will be better to make the milk mixture and sterilise it when it is required, and cool it down to the suitable temperature.

What are the proportions of milk and water to be given to the baby at different ages? As before stated this depends on a number of factors, the principal being the digestive capacity of the infant and the quality of the milk supplied. The former can be ascertained more or less by experiment, the latter by milk analysis. Milk analysis is however a complicated process and within reach of few, so that it is often very difficult to tell what kind of milk we are getting with any accuracy. The

safest method within practicable reach is for the mother or nurse herself to see the cow milked every day, which will prevent dilution. Assuming that there is a supply of good milk and that we use it whole, *i.e.*, unskimmed, we may start the newly born baby on a mixture of one part of milk to three parts of water. If this mixture agrees with him, we may increase the proportion of milk so that at the end of ten days the infant takes one part of milk to two parts of water. In a feed of 3 oz. therefore, we should give 1 oz. of milk and 2 oz. of water. The proportions of milk and water are gradually changed so that the dilution becomes less. By the fifth month the child will probably be taking one part of water to two parts of milk. By that time of course, the amount of the feed will be greater than 3 oz. The child will be taking 6—7 oz. at a feed, and only five feeds in the twenty-four hours. By the ninth or tenth month the baby will take 8—10 oz. at a feed, and 2 pints (40 oz.) of milk in a day. Some children can take practically whole milk at an early age, others do best on diluted milk. For India, the use of whole milk is probably best. It is easier to make the feeds from whole milk than from top milk. To prepare the latter, the milk has to be set so that the cream can rise, and this involves further delay in the use of the milk. As the milk usually reaches us in an already infected state, it is as well that there should not be further delay in its use. The disadvantage in the use of whole milk is that by the time the milk is diluted it is deficient in fat. Cream may be added, but this is not altogether safe, as cream is just as highly infected as milk. If the child's digestion can bear it, we can to some extent make up for the lack of cream by adding more sugar, or when the baby is older some other car-

bohydrate. Olive oil or preferably cod-liver oil may also be used. Young babies, however, do not bear the same proportion of other fats as well as they do that of human milk.

Sugar in one form or another has to be added to the milk mixture, as we have seen already. Lactose or sugar of milk is probably the best, since it is identical with the sugar of the mother's milk. It is however expensive and sometimes unobtainable. In the latter case cane sugar can be used, and many babies thrive very well on it. About $\frac{1}{2}$ oz. of sugar of milk may be given in twenty-four hours at first and the amount increased slowly. The amount of sugar can be measured in a sugar measure, or the mother or nurse can easily ascertain the correct quantity by taking $\frac{1}{2}$ oz., dividing it into six portions, one for each feed, and then seeing how much the quantity is in a household spoon. Of course the same spoon must always be used for measuring.

(For milk tables, see Appendix.)

The apparatus for the preparation of the baby's milk should be kept for that purpose alone and not used for other purposes. The things necessary are bowls for keeping the milk, a $\frac{1}{2}$ -pint glass measure, graduated in ounces, for measuring the milk, a thermometer, and a sugar measure or spoon tested as above; in addition of course the bottle and teat. If a wide-mouthed bottle, which stands upright, is used, the milk can be heated directly in this by standing it in a saucepan of water. The thermometer is held in the milk bottle. Otherwise the milk must be heated in a saucepan, and then transferred to the bottle. The temperature at which the milk is given to the baby is 100°F.

Milk is usually boiled when it is received from the milkman. This is indeed the only safe procedure. After the milk has been boiled and rapidly cooled, it can be used as it is, and simply heated to 100° for use. In using morning milk in the evening however, it is usually safer to boil the milk again before use unless it has been kept on ice all day.

Pasteurization of milk means that the milk is raised to a temperature of 155°F. and kept there for ten minutes. If one is absolutely certain of the source of supply, and that the milk has not been unhygienically handled, pasteurization may be sufficient to sterilize it. From the point of view of digestibility, pasteurization is preferable to boiling, but it is seldom that conditions permit of it in India. Sterilization by boiling is the only safe method to adopt in the vast majority of cases.

The disadvantages of artificial feeding are as follows:—

1. The milk is not perfectly adapted to the child's digestion. Two-thirds of the protein of cow's milk is coagulable protein, and in addition it coagulates in large, lumpy, tough curds which are much more difficult to digest. The fat is in irregular globules; the sugar deficient in amount.

2. Cow's milk is never sterile, human milk is practically sterile.

3. Vitamines are lacking, because they are partially destroyed by boiling.

In towns in India the milk supply is very bad. The cows are kept in an unhygienic way. The stable is generally not clean, and the air dust-laden, flies abound, and a latrine may be found in the near neighbourhood.

The udder of the cow is not washed before milking, nor does the milkman wash his own hands adequately, if at all. The milk is usually received in a vessel which is not sterile, nor is it stored in places where the temperature is kept low. No more care is taken in villages, but there the danger is not likely to be so great as the milk goes more directly from the cow to the consumer.

Generally speaking there is just as little provision for the proper keeping of the milk in the home as there is for the proper care of the cows in the stable. Milk is kept in open vessels and hot places; the vessels are not adequately clean, or they may be washed with infected water. In addition to all these ways in which milk may be contaminated, there is only too frequently deliberate adulteration on the part of the milk-sellers. Water is added to the milk to increase its volume; the cream may also be removed. Substances such as starch, flour, gum and chalk are added to the milk to deceive the consumer, and the milk of cows, buffaloes and goats may be mixed. Preservatives are sometimes added to the milk to prevent it going bad; such are formalin, boracic acid, salicylic acid.

TESTING OF MILK.

The usual household test is the lactometer. This indicates the specific gravity of the milk, and is a good rough test. Milk from which the cream has been removed has a high specific gravity. By watering the specific gravity may be brought to normal. Therefore in addition to the lactometer it is well to use a cream gauge. This is a graduated cylinder in which a specimen of milk is allowed to remain for twenty-four hours, and the volume of the cream is then read off. Since the proportion of fat in

cream is 3 : 5, the total amount of fat in the milk is $\frac{3}{5}$ of the figure on the cream gauge. The tests for proteins and carbohydrates in exact percentages are too elaborate for ordinary use. When milk is suspected of being deficient in any constituent it can be sent to a laboratory for analysis. The same holds good for bacterial infection.

The *diseases* spread by milk are various. First we have gastro-enteritis as shown by diarrhoea and vomiting, caused by sour or infected milk. Cholera, enteric fever, and diphtheria are spread through milk having been adulterated with infected water, or through the vessels having been washed with such water. Tuberculosis spreads through infection from the cow. Malta fever organisms may be present in the milk of goats suffering from that disease. Local disease of the udder may infect the milk with staphylococci and streptococci. Lastly the infant may be upset through the cow having eaten certain herbs or too much wet grass.

In order to reduce the dangers from artificial feeding we must secure:—

1. That the milk is supplied as far as possible sterile to the consumer.
2. That it is kept properly in the home.

As regards the first point we may note the following:—

1. Stables should be properly constructed, *i.e.*, with proper ventilation and drainage and pukka floors, and they should not be in the neighbourhood of latrines.
2. The cows or other animals must be properly groomed and washed and grazed in the open air.
3. They must be free from disease, general or local.

4. The milkman's hands and the cow's udders must be washed in water and an antiseptic before milking. The milkman must himself be healthy.

5. The receiving vessels must be scrupulously clean and sterilized before use by boiling or treating with steam. They should have well fitting covers.

6. The milk should be delivered to the consumer as soon as possible, and till then be kept as cool as possible, on ice in hot weather.

It is obvious that these conditions can only be carried out if a very thorough system of milk inspection exists, and laws penalising the persons not observing the regulations.

The *care of milk in the home* must be an important part of any advice on the subject of artificial feeding. As already stated the milk should in almost all cases be boiled when it is received from the milkman. It should be stirred while being brought to the boil, as then a skin will not form and the cream will not rise to the top so quickly. After the boiling the milk should be cooled as quickly as possible. Warm milk is an excellent breeding ground for micro-organisms. The milk can be cooled by placing the jug containing it in running water for half an hour. If running water is not available then the jug can be placed in a vessel containing cold water which is changed several times. After cooling it is best placed on ice in the hot weather. Failing that the jug may be placed in a wide vessel containing water. Over the jug are placed two thicknesses of gauze or muslin which dip into the water all round. This is very effective for cooling in the dry heat owing to the amount of evaporation that goes on. The milk should be kept in a dooli in as cool a place as possible; and not near a rubbish heap, drain, etc.

All bowls, jugs, and other vessels used for milk must be kept scrupulously clean. When emptied they should be rinsed out with cold water and then with boiling water and soda. Any utensils used in preparing the milk for the baby, such as spoons, measure glass, etc., must also be so cleansed. The baby's bottle should be boiled once a day. The milk for the next feed should never be kept ready warm in the bottle: this encourages the growth of bacteria in it. The milk should be kept as cool as possible, and only the amount required for the next feed heated before use.

Feeding Bottles should be simple in construction with no corners where stale milk can lodge. The teat should fit over the neck of the bottle, a valve is not necessary. A long tube should never be attached to the teat as in old-fashioned bottles. (*N.B.* These long tube bottles are so dangerous that a law has been passed against their use in France.) The hole in the teat should be quite small unless the baby is very weakly. Unfortunately the hole soon becomes too large, consequently the teat should be changed frequently. It can be tested by holding the bottle upside down and observing the rate at which the milk drops out. If the hole is too large the child gets the milk too easily and takes it too quickly. In addition he does not get the same good exercise for his jaws as when the hole is small. In the teat we try to imitate the mother's nipple; and it should be remembered that the milk does not flow easily out of the breast, but has to be sucked out by vigorous action on the part of the child. The teats should be capable of being turned inside out for cleaning. They should be scalded once a day by having boiling water poured over them, and after each feed they should be rinsed outside and in and rubbed with common salt,

then dried and put in a covered jar. The bottle must be held by the mother or nurse *all* the time the baby is feeding. If the baby takes his feed slowly, and the milk gets cold, he may refuse to finish the bottle even though not satisfied. A good plan is to have a bag of flannel made as a cover for the bottle which will prevent the milk getting cold so quickly. Of course it must be washed frequently and kept perfectly clean.

Some babies are never put on bottles at all, but are spoon-fed from the beginning. This is easier for poor people, as bottles and teats are expensive. It is also simpler for the ignorant, as the apparatus is more easily kept sweet and clean. Otherwise there is nothing to be said for it. In artificial feeding, as already mentioned, we must imitate not only the composition of human milk, but the way in which it is given. The child needs to pull and suck at the teat to develop his jaws and the attached muscles, and his teeth. Feeding with a spoon cannot supply that necessary exercise.

It is very important to give artificially fed babies fruit juice in order to supply vitamins. Orange juice is the best. It should be strained and diluted with twice the quantity of boiled water. Half a teaspoonful a day may be given from the third month onward, gradually increasing the quantity.

If a baby for any reason, such as the death or illness of the mother, has suddenly to be taken off the breast and put on cow's milk, he should be given a weaker mixture at first than his age would indicate, and be allowed gradually to become accustomed to a stronger one.

Cow's or goat's milk, properly adapted to the needs of the child, is better than dried or condensed milks or patent foods.

With artificially fed babies as with breast-fed, weaning should be accomplished gradually, and the babies should be given hard substances to chew, not just soft mushy foods. The developement of *both* sets of teeth is aided thereby.

IV: REGULAR HABITS AND DISCIPLINE.

The value, or rather the necessity, of regularity has been emphasised particularly in regard to feeding, but it is no less important in the other functions of life, *e.g.*, sleep, exercise, action of the bowels, etc. It should be remembered that training can and should begin immediately after birth. The baby *can* be trained in good habits. If he is not, bad ones will develop, and it is far more trouble to eradicate these than to take pains in the beginning. Discipline does not mean harshness as so many Indian mothers are apt to think. It means training the child to be the minimum amount of trouble to himself and to others, to control his own impulses, and later to guide them into right channels. Such training is for the child's good, and therefore shows truer love than indulgence which harms him. It demands self-denial and self-control on the part of the mother who is constantly tempted to yield to the child's cries even when she knows that in doing so she is not doing the best thing for the child. Babies who are taken up or fed whenever they cry not only do not get proper rest themselves but also prevent their mothers having it. Babies who have not been trained to regular bowel action cause their mothers infinitely more trouble in the long run, by irregular habits. The same holds goods with passing water. If babies were trained in this there would be fewer wet

napkins and less washing to do. Training along these lines certainly means an effort in the way of patience and self-control, and may seem to involve more time and trouble at the moment. But it saves both time and trouble in the long run, and in addition the mother has the satisfaction of knowing that she has laid the foundation of good habits in her baby, and is helping him, almost while he is unconscious of the process, in his childish struggles towards learning the self-control which is so necessary to him in later life. In trying to lead the mothers into adopting such ways and explaining them to them, the Health Visitor must be careful to explain in simple language, but as fully as possible, the reasons for such action, and lay stress on its advantages both to mother and child.

In all houses where it can be afforded and understood, a clock should be regarded as an indispensable piece of the furniture. Regularity in times of feeding, etc., cannot be expected if mothers have no idea of the passage of time; it cannot be done by guess-work. Fathers and husbands should be enlightened as to the necessity of clocks and encouraged to buy them for their wives.

SECTION 2.

SICKLY BABIES.

I. PREMATURE BABIES.

Infants born after they are *viable*, that is to say after the 6th month of intra-uterine life, but before full term, are said to be *prematurely born*. They seldom survive at that age, but if born at 7 or 8 months can be reared if proper care and trouble are taken. Their great need is warmth and the avoidance of sudden changes of temperature. In order to imitate as closely as possible the inside of the uterus, where the temperature never varies, incubators have been designed. The essential parts of an incubator are a box, so constructed that the air entering it is heated by some form of lamp, which maintains a steady heat. Incubators are scarcely practicable except in hospitals, but we can substitute a home made article in the shape of a well padded box or basket, kept in a place where the temperature will not fall, *i.e.*, in winter in a room with a fire, or other form of artificial heat. Hot bottles can be used to warm the bed, but they must be used with great care. The exceedingly delicate skin of the baby is very easily burned, and in addition the temperature of a prematurely born baby is just as apt to go far above normal by the use of too much heat as it is to fall below normal with too little heat. The temperature of

the baby should be taken, preferably in the rectum, every few hours at first to prevent these sudden rises or falls in temperature. Air must not be excluded along with cold; sufficient ventilation must always be secured even for a premature baby.

If the skin of the infant is very delicate, no attempt should be made to bathe or clothe it. It should be well smeared over with oil, and wrapped in clean cotton wool. The oil bath described above should be given every day till the child is robust enough to receive a bath with water.

Premature babies are frequently not strong enough to take the breast, but have to be spoon-fed. The mother's milk, or that of another woman, may be withdrawn by the hand or a pump, and given to the infant. The child is much more likely to survive if human milk can be supplied, but if not, a very weak mixture of cow's milk and water can be given, say one part milk to five of water at first. Instead of a spoon, a medicine dropper may be used to feed the baby. The feeds should be given every two hours.

Premature babies must be very carefully handled. Indeed the less they are handled the better. It should be remembered that their natural environment is water (the *liquor amnii*) in which they are protected from differences of pressure.

II. DISORDERS OF THE STOMACH AND INTESTINES.

THRUSH.

This is a disease of the mucous membrane of the mouth which consists in small white patches which appear on the tongue, cheeks, and hard palate. The patches look like coagulated milk, but they are easily distinguished by the fact that they can only be removed with difficulty, and if this is done, there is usually bleeding. The actual cause of thrush is a fungus, but the disease usually only develops if the mucous membrane of the mouth is unhealthy, or where it has been injured by rough handling, *e.g.*, in unwise attempts to clean the mouth. Want of cleanliness in the care of bottles and teats, and digestive disturbances, all favour its occurrence.

The baby frequently refuses food on account of the pain caused, the mouth is dry, and there may be vomiting and diarrhoea.

Thrush may almost always be prevented by strict attention to cleanliness. As already mentioned it is unnecessary to wipe out the mouth of a healthy baby and to do so more often leads to thrush than prevents its occurrence. If spots of thrush are observed in the mouth, the baby should be shown to a doctor who will advise the mother how to treat him.

SLIGHT VOMITING.

If the baby brings up food soon after the feed, it may be due to its having been given too frequently or to too

much being given at one feed. It may also be due to too rapid feeding, either in a breast-fed or bottle-fed baby. Sometimes it is caused by too much handling of the child after food. The mother will usually have some idea as to which of these is likely to be the cause of the vomiting in her child. Experiment will help to prove if she is right. The child can be tried with less food at any one feed or with longer intervals between the feeds. If a breast-fed baby is taking the milk too quickly, the mother can compress the nipple between her first and second fingers, and so make the flow slower. Or else she can remove the child from the breast for a few minutes at intervals. In a bottle-fed baby, too quick feeding is generally due to too large a hole in the nipple. Handling or playing with the baby after a feed is bad. The child should be supported on the mother's shoulder for a few minutes to help him to get rid of wind, and then put in his own cot to sleep.

TOO MUCH WIND.

This causes painful colic, and is also frequently due to too much food, also to unsuitable food and to the food being given too often or too quickly. Constipation and a chill are other causes. The application of a warm flannel to the abdomen or massage of the abdomen with a warm hand often relieves it, or a pinch of bicarbonate of soda with or without dill water. Mothers should, however, not be allowed to think that it is right to be constantly giving babies doses of dill water. If colic is constantly occurring the baby must be shown to a doctor.

CONSTIPATION.

This is troublesome in some babies, more especially in artificially fed babies. One reason for this is that

artificially fed babies are usually receiving less fat in their food. If we can safely increase the amount of fat in the feeds we shall probably cure the constipation. But what was said previously must be borne in mind, namely, that very often babies cannot bear the same amount of other fats as of that in mother's milk. Sugars are also laxative, especially maltose, and may be increased if extra fat cannot be taken. Sometimes the addition of some malted food, such as Horlick's Milk or Mellin's Food, to the diet once or twice a day will bring about regular motions. Fruit juice may be given, *e.g.*, grape or orange juice, or for older babies apple pulp or the juice of stewed prunes. It is very important that regular habits should be formed with regard to bowel movements, and then constipation is not so likely to occur. In breast fed babies constipation in the mother often causes a similar condition in the child. The mother, by treating herself by diet or other suitable measures, can often cure the child. Massage to the abdomen is often helpful. It should be done at the time when the child is to have the daily motion. The fingers are passed from the lower part of the right side of the abdomen, upwards, across the abdomen and then down the left side. The pressure should be gentle at first. Drugs should not be given except by a doctor's advice. A small enema (1—2 oz.) of salt and water (normal saline, salt 1 dram, boiled water 1 pint) may be given, or a small soap suppository may be used occasionally.

OCCASIONAL DIARRHŒA.

This is usually due to carelessness in the preparation of the milk or in the sterilizing of the bottle, or to a chill.

One or two teaspoonsful of castor oil may be given, and the feeds should be diluted or omitted altogether and replaced by water. Mothers often do not understand this and think the baby is being starved. It should be explained to them that as the processes of digestion and absorption have temporarily ceased there is no need for food, indeed it does harm by irritating the already tender bowel. The baby will be able to take his food again all the quicker if the intestinal canal has a rest. If diarrhoea occurs in breast-fed infants the milk may be diluted by giving the baby water to drink before he takes the breast, or else the child may receive no breast milk for a few feeds. The mother must in the latter case carefully withdraw the milk from her breasts in order that the supply may be kept up. Diarrhoea is never a thing to be treated lightly, and the advice of a doctor should be taken early rather than late. It is very apt to be fatal to young babies, especially in the hot weather and rains when it most frequently occurs. Remember that constipation often precedes diarrhoea, and is apt to cause it. The hard stools irritate the bowel, and they also indicate that the digestive processes are not going on as they ought.

It should be remembered that diarrhoea and vomiting are symptoms, not diseases. When a baby shows signs of intestinal upset we must try to find out the *cause*, more than that we must try to prevent its occurrence. It is most often met with in bottle-fed babies, and the most frequent reasons in their case are first, that the food is not perfectly adapted to the child, and second, that everything is not sterile, and sufficient care is not being taken with bottles, napkins, etc. The other causes mentioned above are common to both breast-fed and bottle-fed babies.

Where symptoms of indigestion appear in breast-fed babies, this is not an indication that the baby should be at once taken off the breast. What we must do is to weigh the baby weekly to see whether he is gaining or losing weight, and at the same time we can modify the mother's milk by hygienic or dietetic measures. Sometimes the milk may be either too rich or too poor in some one constituent, and this is what causes indigestion. We can by careful study gain some idea of the particular element in the food which is giving trouble. This holds good also for bottle-fed babies, but of course in their case it is easier at once to modify the food. In spite of this we should never advise that a breast-fed baby be removed from the breast without an attempt to modify the mother's milk.

If we can find out which constituent in the milk (whether mother's or cow's) is disagreeing with the baby, we can reduce that particular one without diluting the milk as a whole and so starving the child. This is obviously a great advantage.

Some of the symptoms of excess or defect of a particular element in the food are as follows:—

Excess of protein usually causes the bowels to be loose, and the motions are green or yellowish green, and contain yellowish white masses of undigested curd. Occasionally the stool is crumbly and dry and is passed with straining. (This is especially the case when the child is receiving too little carbohydrate along with excess of protein, *e.g.*, in a child taking diluted whole milk.)

Deficiency in protein results in stationary weight; the child is feeble, anæmic and underdeveloped, and the teeth appear late.

Excess of sugar causes a sour watery vomit, and sour watery stools which excoriate the buttocks. The child

usually suffers from colic caused by the fermentation of the sugar producing gas. This may also occur with other forms of carbohydrate, as in patent foods.

Deficiency in sugar causes the child to lose weight; he is irritable and constipated.

Excess of fat causes loose motions containing white masses which are frequently mistaken for curds. A simple test to distinguish them is that when they are placed on water, oil drops float on the surface.

Deficiency in fat prevents the child from gaining in weight and makes him constipated and fretful because he is not satisfied. Rickets may follow.

The importance of *vitamines* has already been emphasised.

MODIFICATION OF MILK.

Besides merely omitting or reducing the quantity of any particular element in the food, we may in some cases render it more easy to digest by special measures.

The chief difficulty in digesting the *protein* of cow's milk is the large tough curds it forms in the stomach. We attempt therefore to change the curd into something easier for a delicate child to digest. We can, in fact, get rid of the coagulable protein altogether by feeding the baby on whey instead of whole milk. (For preparation of whey, see Appendix.) Whey is also used in the preparation of so-called "humanized milk," which is a mixture of ordinary milk and whey. It is a very good thing for some babies. It contains nearly all the sugar of the milk but is poor in fat which may be added if the child can take it. If a child is put on to whey feedings, this does not mean that he is to be permanently kept on them.

Top milk or whole milk can be added gradually, replacing the whey, till finally the child is once more digesting whole milk and is able to do without whey.

Then again we can break up the curd, *i.e.*, divide finely and so render it easier to digest. This is usually done by the use of "gruels" or "cereal decoctions" dilute the milk instead of plain water. The most familiar of these gruels is barley water, but rice and whey may also be used, and oatmeal is good, especially where there is a tendency to constipation. They are made simply by boiling with water and straining (see Appendix).

The use of citrate of soda prevents all coagulation of the milk in the stomach. This is useful at times, but should not be continued for too long. Gr. i-ii of citrate are used for every ounce of milk. Many authors recommend the use of citrated whole milk for quite young babies. This conserves the proper amount of sugar and fat for the infant while rendering the protein more digestible.

The milk may be predigested, that is, acted upon by a ferment before it reaches the stomach. This can be done by the use of peptonising powders or of Benger's Food. The required quantity of peptonising powder or Benger's is mixed with a little of the milk mixture cold. The remainder of the milk is then brought to the boiling point and poured over the solution. After that it is kept warm for fifteen to twenty minutes, and then brought to the boil again. The time when the mixture is kept warm is the time when the digestive action of the ferment is going on. The ferment is destroyed by further heat so that the digestive process can be interrupted at any time simply by heating the mixture to the boiling point. If

for any reason the milk has to be predigested, the process should not be kept up indefinitely, or else the child will not exercise its own digestive powers. The time of predigestion should be shortened gradually till the child is able to digest the milk by himself. (Benger's Food contains flour and extract of pancreatin, so that it has a double action, both modifying the curd and predigesting the protein.)

It must always be kept in mind that all these processes of modification of the milk are for temporary use only. They may help the child over a difficult time, but our object should always be to strengthen the child's own digestive processes rather than to give him already digested food.

If the child has difficulty in digesting *fat*, as we have seen is frequently the case, we may reduce the fat, or omit it from the diet altogether. If it is necessary to do the latter, then we can feed the child on skimmed milk, *i.e.*, milk from which all the fat has been removed. As we have already seen, whole cow's milk contains a smaller proportion of fat than human milk, but frequently as much as the child can digest. We may reduce the amount of fat by using partly skimmed and partly whole milk, or by using partially skimmed milk. Pancreatisation of the milk helps to make the fat more digestible. If the child shows great inability to digest fat, extra carbohydrates instead of fat may be given in the shape of sugars, or starchy foods when the baby is old enough. They will make up to some extent for the lack of fat by giving heat-producing elements, but of course they cannot in other ways act as substitutes for fat. Lime water is frequently used to dilute milk. It is slightly alkaline, and this is a help where there is intolerance to fats owing

to their tendency to produce an acid condition in the intestines.

Sugar does not usually cause so much difficulty. Its use must be stopped when there are indications that it is producing indigestion, and then begun again cautiously, in smaller quantities, till we are quite sure the child can take it.

Diluents, or liquids added to the milk in order to increase its bulk or to dilute its strength, are various. The most common of course is water, and for ordinary purposes it is also the most convenient and best. Others have already been mentioned under the special conditions for which they are required, such as barley water, lime water, etc.

Indications that a food is not adapted to an infant may be summarised as follows:—

The weight does not increase.

The muscles are flabby.

The child suffers from vomiting, diarrhoea, or other symptoms of indigestion.

The child is irritable and does not sleep well.

The indications that a food is proving successful are:—

The child gains in weight.

The muscles are firm and well developed.

The bowel motions are regular and normal.

The child is happy and sleeps well.

In conclusion, our object should always be to prevent the occurrence of intestinal upsets through careful attention to general hygiene and study of the needs of the

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child as regards food. The more serious forms of indigestion, etc., cannot be considered here. If symptoms of such arise, the baby must be taken to a doctor at once.

III. MARASMUS.

Marasmus means wasting, and is a disease where there is progressive loss of weight owing to the food given to the infant not being properly assimilated. For this reason it is seldom seen in breast-fed infants, but mostly in neglected children or those to whom improper food is being given. It is often seen in famine conditions, where proper food is not available, or after summer diarrhoea where the intestine has been rendered incapable of normal absorption. Improper feeding by itself can cause this condition. Poverty, want of hygiene, etc., all help to cause marasmus.

In appearance the child looks wizened, shrunken and wrinkled; there is great emaciation and feebleness. The tongue is frequently red, and there are patches of thrush in the mouth and excoriation of the buttocks. The abdomen may be distended. The character of the motions varies according to the nature of the food given. The infant may display a good appetite, and often sucks his fingers till they are raw. In spite of this he loses weight progressively. Infants suffering from marasmus easily fall a victim to other diseases, especially those of the lungs, and infectious fevers.

The treatment is almost entirely dietetic. The infant should be taken to a doctor who will be able to diagnose the previous mistakes in diet, and advise as to the correct

feeding of the child. If taken in time, diet is nearly always successful in treating marasmus. If the child is kept at home and not sent to a hospital, the work of the Health Visitor will be to see that the prescribed diet is regularly given, and all other necessary hygienic measures properly carried out. Regular weekly weighing is very important in cases of marasmus, for gain in weight indicates that the food is being properly absorbed.

IV. RICKETS.

The exact cause of rickets is not as yet definitely known, but the opinion is growing that it is one of the "deficiency diseases," i.e., those caused by the absence of vitamins in the food. The result of the disease is a disturbance of metabolism, of which the chief symptom is seen in the bones. It is not very common in India, probably owing to the fact that the great majority of infants are breast-fed. But it is of importance because the bony deformities, when affecting the pelvis, may cause trouble in child-birth later on. The disease is usually found in artificially fed babies, for example those fed on condensed milk, as in this food protein, fat and salts are all lacking, while carbohydrates are in excess. Unhygienic conditions of all kinds seem to promote the disease. It is most usually seen at 9-18 months of age, hence the idea that it is connected with too early walking.

The chief symptoms are sweating of the head, restlessness and irritability of the child, and muscular weakness. The child does not move about his limbs or attempt to crawl as normal children do; if young he does not hold up his head properly. The liver and spleen are often enlarged. The head is square in shape, there may be soft spots in the bones, the fontanelles are late in closing, the teeth are late in coming. The ribs are enlarged at the junction of bone and cartilage, forming

the so-called rosary; the sternum is depressed and the upper part of the chest narrow; there may be curvature of the spine. The most common and marked deformity of the pelvis is the narrowing of the antero-posterior diameter of the inlet, or true conjugate. The arms and legs are often bent, and the ends of the bones are enlarged, especially at the ankle and wrist. The abdomen is frequently protuberant, due to muscular weakness and fermentation in the intestine.

Children suffering from rickets can almost always recover if properly treated. Even the bony deformities disappear in a wonderful way if they are taken in time. The great thing in treatment is to remove the child from unhygienic surroundings, and to place him upon a proper diet.

The Health Visitor will probably sometimes see mild or early cases of rickets, in home visiting or baby clinics, when the parents are quite unaware that there is anything wrong with the baby. She can then give advice about diet or hygiene, and save the child from the more serious forms of the disease. Severe cases should be sent to a hospital for treatment, unless the parents are unusually intelligent and will co-operate faithfully in the carrying out of treatment.

V. DISORDERS OF THE RESPIRATORY TRACT.

The diseases which affect the organs of respiration, *i.e.*, the nose, mouth, throat, windpipe, and lungs, are all diseases of which the primary cause is micro-organisms or bacteria, which invade the tissues of these parts. Without the presence of such organisms we should not have these diseases. We therefore call them the *primary cause*. These organisms are, however, usually present in the air in large numbers where human beings live, especially in large cities, and yet we do not find that all the inhabitants are suffering from such diseases. The reason for this is the effect of what are called *secondary causes*, which act in two ways:—(1) they produce conditions which favour the growth of the organisms, and (2) they lower the power of resistance to the action of the organisms on the part of the tissues. It is not in our power to destroy these organisms in the way in which we can, for example, destroy those of cholera, hence our main efforts must be directed towards controlling the secondary causes. Of these the most important is connected with the nature of the air we breathe.

A good deal of emphasis has already been laid on the necessity for fresh air in the general development of babies. This must again be specially borne in mind in connection with the prevention of such trouble as colds,

bronchitis, pneumonia and tuberculosis. The vital connection between the kind of air we breathe and these diseases is shown by the fact that they are common where fresh air is excluded, and that abundant supplies of pure air help both to prevent and to cure the conditions. It is to be remembered that we not only find these diseases in large cities, where it is naturally more difficult to secure the proper amount of pure air. It is quite possible to find conditions just as unhygienic merely because the children are kept in confined quarters or sleep in unventilated rooms, even though the surroundings are perfectly suitable. Such conditions are met with under the purdah system, the children of course being forced to share the shut-in lives of their mothers. In India babies are not shut up in a room by day, but in winter the rooms are very apt to be hermetically sealed by night. Poverty encourages this practice, as when the bed coverings are few it is natural to try to exclude the cold air. Often however it is mere habit that causes the doors and windows to be shut and the bed coverings pulled over the head, or else it is due to the fact that both babies and adults have not been hardened to cold air from the start of life, and feel the cold more as a result.

The Health Visitor must never be tired of explaining the value of fresh air, and warning mothers against the danger of excluding it and the diseases which follow from doing so.

Another common cause of colds, etc., about which we hear a good deal nowadays, is *adenoids*. Adenoids are overgrowths of the lymphoid tissue at the back of the nose. If they grow at all large they block the passage for air at the back of the nose and the child is forced to breathe through the mouth. Now the nose is the proper

passage for the air. By passing through the nose the air is warmed, it is also purified of gross impurities such as dust, and to some extent of micro-organisms. If the child breathes through the mouth, the cold air has direct access to the lungs, dust is not arrested, and micro-organisms have passed the first line of defence to the lungs. Adenoids are frequently accompanied by enlarged tonsils which help to block the airway to the lungs through the mouth. If this double barrier to the lungs exists what will be the result? A sufficient amount of air is not supplied to the lungs, they are prevented from expanding properly, and as a consequence the chest is also not developed, and we get narrow chests and round shoulders. The used air has the same difficulty in escaping as the pure air has in reaching the lungs, and so the waste products tend to remain in the system. The blocking of the air passages produces deformity not only in the chest but also in the mouth and jaws. The palate becomes more arched, and the shape of the upper jaw, instead of being rounded, becomes V-shaped. The nostrils are narrowed, the lips thick, and the child has a heavy apathetic look. He sleeps badly at night owing to breathing through the mouth, and he often suffers from earache, and from deafness. This is due to the fact that the growth tends to cover the Eustachian Tube, or passage between the pharynx and the ear. The tissue of the adenoids and enlarged tonsils is diseased tissue, and micro-organisms find such tissue a very suitable breeding ground. Hence we get the chronic "cold," with perpetual nasal discharge, and with little encouragement these micro-organisms penetrate into the lungs and cause bronchitis and pneumonia. In addition tubercle bacilli settle in the diseased tissue and so gain a footing in the body. (For example the infection spreads from the

tonsils to the glands in the neck, causing them to become enlarged, a very common condition among children.)

These consequences of adenoid growths are of course not often seen in children as young as those we are considering. It is while the children are mere infants however that the damage is begun, and the matter is so important that it is well to understand what follows from allowing such growth to take place. What then is it which in the first place causes the adenoid tissue itself to grow? This has been a debated point for many years. There is a growing opinion latterly that though it is fostered by bad hygienic conditions and by damp air, the root cause is want of proper development of the jaws, mouth and nose. We should thus expect to find adenoids more commonly in children who have been bottle-fed, for it is very difficult for such babies to get the same amount of exercise for the mouth and jaws in taking their milk as breast-fed babies. In the same way babies who are not given hard substances to chew when young, but are fed on soft food only, do not have the same development of the jaws. Another cause which is freely blamed for the occurrence of adenoids is the use of the "comforter" or dummy teat. It is often given to children to keep them quiet. Sad to say, the introduction of more enlightened methods of feeding and rearing children is often accompanied by the introduction of much less desirable things. Among these are feeding-bottles, often of the wrong design, mushy patent foods and worst of all, the dummy. Among the better-educated who have begun to adopt some western fashions, it is to be feared that we may find infants, to their great detriment, being fed on expensive patent foods instead of tugging at pieces of hard chapati, and being soothed to sleep by the use

of the dangerous dummy. The proper development of the jaws, therefore, will prevent the growth of adenoids, and thus keep the natural passages clear to the lungs. The extra blood supply which hard exercise brings to the mouth and surrounding parts, helps in itself to keep these tissues healthy and resistant to disease germs. With these introductory remarks, we may now proceed to give some details as to the actual diseases which affect the respiratory tract.

COMMON COLD.

This is an inflamed condition of the mucous membrane of the nose and naso-pharynx. It is very common and is not serious in its immediate effects. But it often precedes more serious conditions, and if it becomes chronic it lowers the vitality of the child, and produces an unhealthy condition of the nose and pharynx which predisposes to tuberculosis. The nasal discharge is the most prominent symptom, and is troublesome in young babies as they cannot of their own efforts clear the passages, and it is difficult to do so effectively for them. The baby has to breathe through the mouth, and this causes disturbed sleep and difficulty in taking the breast properly. There may be a slight rise of temperature.

The causes of colds in the head are various. It is quite erroneous to think that contact with cold air is the one and only cause. The primary cause, as already noticed, is the presence of bacteria in the nose and pharynx. The most important secondary cause is want of proper ventilation, *e.g.*, sleeping in closed rooms or sleeping along with other persons. A wrong amount of clothing is quite a common cause in babies. Most often the amount of clothing is in excess, so that the baby

perspires freely and is liable to chill quickly. But colds may also be caused by insufficient clothing, for an amount of covering which is sufficient for a baby lying in the mid-day sun, is not sufficient to protect him from the cold of early morning and evening. Direct infection frequently occurs, the cold passing from one member of the family to another, either by simply being in the same room, or by kissing, or through using the same towel as an infected person. Dust predisposes to infection by setting up an irritable condition of the mucous membrane. Adenoids, as already mentioned, are a common cause of colds. A cold in the head is one of the symptoms of the onset of several infectious diseases, notably measles and influenza.

Prevention of colds lies, of course, in improving the hygiene when faulty, in encouraging sleeping in the open air, or, where there is free access of air, in the use of proper clothing, and the treatment of adenoids if these exist.

BRONCHITIS.

Bronchitis means an inflammation of the mucous membrane of the bronchi, and it varies in severity according as the larger or the finer bronchi are affected. In the former case the inflammation and accompanying secretion do not block up the passage to such an extent as in the latter case. The breathing is therefore not interfered with so much.

Causes of Bronchitis.—Delicate children seem very liable to attacks of bronchitis, and a slight chill may bring one on. One attack does not protect from another, rather the reverse. It often starts with a cold or sore throat which spreads down into the bronchi by direct infection. Enlarged tonsils and the presence of adenoids

render children liable to bronchitis. It frequently accompanies attacks of influenza and measles. As in the case of colds, want of proper ventilation weakens the resistance of the child to bronchitis. Too much or too little clothing may play the same part as in colds.

The child's breathing is rapid, the pulse rate is also increased, and there is fever. Cough is present, but young babies have great difficulty in getting rid of the secretion in the bronchi by expectoration as easily as adults can.

A case of bronchitis should always be seen by a doctor, but in the meantime the child should be kept warmly in bed. Fresh air must *not* be excluded, but change of temperature must be avoided, *i.e.*, the room temperature must remain constantly the same.

PNEUMONIA.

In pneumonia the infection penetrates still further into the lung, and affects the air vesicles. The infection comes primarily from the mouth and throat. Poor hygiene helps, and the debilitating effects of other diseases, *e.g.*, syphilis. Infection from another person suffering from the disease is not so common.

A child with pneumonia is obviously very ill. He has a high temperature, breathes quickly and with difficulty, sometimes he is blue with cyanosis, that is the blood is not properly purified by air owing to the obstruction to its flow in the lungs. He does not cry loudly, as it is as much as he can do to inspire an ordinary amount of air.

A child with pneumonia should be treated without delay by a doctor. Nursing is important, so that the child should be sent to a hospital if possible.

Bronchitis and pneumonia are very fatal diseases to young babies. It is important therefore that we should try prevent their occurrence. There is no absolute means of prevention, but fresh air, improved hygiene, and other measures as described above will all help to make the baby resistant to attacks of bronchitis and pneumonia, and this is the best means of prevention. As both these diseases frequently follow attacks of measles and whooping cough, it is important that these latter should receive more attention and more careful nursing than they usually do.

TUBERCULOSIS.

Although tuberculosis is not a disease which attacks merely the respiratory tract, it is convenient to deal with it here.

It is due to the invasion of various tissues of the body by tubercle bacilli. The tissues most frequently involved in babies are the *meninges* or membranes covering the brain and spinal cord, glands, including those connected with the lungs and intestines, and bones. The lungs are not frequently involved in young babies.

The causes of tuberculosis.—The primary cause of course is the presence of the bacillus. Any conditions which are favourable to the growth of the bacillus, and which help to lower the resistance of the body to its attacks, are secondary causes. Lack of fresh air and unhygienic condition of all kinds favour the growth of the bacilli. So also does lack of sunlight. Direct sunlight seems to have a great effect in killing the bacilli. Causes within the body itself are the presence of adenoids or other unhealthy conditions of the nose and mouth. The

tubercle bacilli are usually inhaled, and if the upper part of the respiratory and intestinal tracts are not healthy, the bacilli find a ready resting place in the diseased tissues. Heredity undoubtedly plays a part in the causation of tuberculosis. It is not that the disease is directly conveyed from the mother to the child, but that the *disposition* towards the disease is inherited by the child from its parents. Much infection is conveyed directly from one person to another. A child with a tubercular mother is constantly exposed to infection, because he is of necessity in such close and continual contact with her. This holds good even when the child has passed the stage of infancy. Statistics have shown that the amount of tuberculosis among children is greatest when they belong to the classes observing purdah. This is because the children, when young, are in the same confined atmosphere as their mothers. Apart from merely breathing the same air, infection can be conveyed by kissing, by the use of the same towel or handkerchief, or of the same eating and drinking vessels. Babies fed on infected cow's milk may develop bovine tuberculosis, usually of the glands or intestines. This is, however, uncommon in India.

It is impossible here to enter into any details as to the various manifestations of the disease. Nor is it necessary. It is the primary duty of the Health Visitor to combat all the conditions, either in the surroundings or in individual children, which she sees favour the disease and hamper the child in its fight against it. For this reason it is much more important for her to study the cause and prevention of the disease than to know about the symptoms. What then are the means which can be taken towards prevention?

Means of Prevention.—The first and foremost of these is proper ventilation, an essential need. Fresh air and sunlight are the great enemies of the tubercle bacilli. In India the houses are constructed so as to let in the maximum of air, but also the minimum of sunlight. This is necessary on account of the strength of the sun. But the sun can be utilised in other ways. Bedding, etc., should be freely exposed to its rays. Children should sleep in the open air when the time of the year permits, and at other times in a place where there is abundant access of air. Children should as far as possible be removed from contact with persons suffering from the disease. If the mother is tubercular, she should not be allowed to nurse the child, indeed the child ought not to be with her at all. No members of the household who are infected should be allowed to handle the baby, and they should take the usual precautions as to destruction of sputum, etc. The child himself should of course be brought up in as hygienic conditions as possible to make him resistant to the bacilli. If he suffers from enlarged tonsils or adenoids or chronic colds these must be carefully treated. If the baby is being artificially fed, care should be taken that the cow is healthy. The Health Visitor will study elsewhere the means of prevention of tuberculosis in greater detail, so more need not be said here. The special needs of infant life and the special dangers to which babies are exposed must be borne in mind when we consider the subject from the point of view of infant welfare.

VI. SKIN AFFECTIONS IN INFANCY.

We shall deal here only with the more common and simple skin troubles as they affect babies.

PRICKLY HEAT.

This is a common and troublesome complaint with babies in the hot weather and rains. It can be largely alleviated by proper measures.

It consists of tiny red papules or swellings, which occur close together, and are sometimes topped by a tiny vesicle. The eruption is found on those parts of the body where there is most perspiration, *i.e.*, the forehead, neck, back and chest. The parts affected are extremely irritable, and if the child is old enough, he tries to scratch himself. In any case the itching makes him cross, out of sorts and restless.

Babies suffering from prickly heat should be clothed as lightly as possible. A muslin *kurta* is sufficient for the daytime. Soap should not be used over the affected parts. Gram flour (*besan*) or oatmeal may be used in the bath instead of soap. Bathing with a weak carbolic lotion (strength 1 in 80) will relieve the itching. After the bath the skin should be carefully dried, and then powdered with starch and boracic powder to which a little salicylic acid may be added (1 oz. each of starch and boracic acid and 20 grs. of salicylic acid).

INTERTRIGO.

This is the name given to an eruption developing between two skin surfaces which are continually in contact and become moist. It is therefore seen in infants in such places as the groin, the armpits, the folds of the neck and, in boy babies, between the scrotum and the thighs. The affected parts are red and moist, and sometimes the upper layer of the skin has peeled off. It should never be found in babies who are in good condition and properly looked after. Daily bathing and careful drying after bathing are sufficient to prevent its occurrence.

ECZEMA.

This is a term rather loosely given to inflammation of the skin which may have more than one cause. Owing to the delicacy of their skins, children are more liable to eczema than adults, and some children seem to be peculiarly susceptible to it. These children are often well nourished and fat, and it is thought that overfeeding plays a part in causing the disease. It most commonly begins on the cheeks, forehead and scalp, but any part of the body can be affected. It shows itself at first by a redness and roughness of the skin, and small red papules appear. The surface then begins to become moist owing to the fact that serum is exuded. This serum dries and forms crusts on the surface. If the crusts are removed, a moist red surface which bleeds easily is always seen. As there is a great deal of itching, the child tries to scratch himself and so causes more bleeding. The constant itching causes the child to be very irritable and interferes with sleep, so that the general health suffers.

The disease is apt to be rather chronic, and the treatment has to be carried out very patiently and persistently. Numerous preparations are given for the treatment of eczema. It is best for the child to be placed under the care of a qualified doctor. The Health Visitor has to see that the treatment advised is properly carried out, and that the general hygiene is good. She should also see that patent medicines are not used, as ignorant parents are so frequently led astray by deceptive advertisements.

INFLAMED OR EXCORIATED BUTTOCKS.

This is due to want of proper attention to cleanliness, to napkins being dried and reapplied without washing, and to certain forms of diarrhoea (see page 104). If the cause is want of cleanliness that should be seen to. If it is due to diarrhoea, it is difficult to stop till the diarrhoea passes off.

In dealing with this condition it is very necessary to keep the parts thoroughly dry. It is not necessary to use powder for this purpose; powder really only dries up any moisture the mother or nurse has left from insufficient use of the towel. The parts should be carefully washed with warm water, then dried carefully, and some ointment applied. Any simple ointment will do. The part may then be protected by a small piece of lint, cotton wool, or soft clean old linen.

ULCERS AND BOILS.

Among babies who are brought to dispensaries, there are few more common complaints than ulcers or "sores." They are seen especially in the hot weather and are often very chronic. The immediate cause is usually either some abrasion of the skin which has become infected, or else a boil or small abscess which has burst by itself and

not healed up. The condition is of course enormously helped by bad hygiene, want of cleanliness either in the baby itself or in the surroundings, and an unhealthy condition of the infant. Boils or small abscesses sometimes occur in great numbers in babies; they do not usually form a "core." These crops of boils, especially when they occur in infants who are suffering from malnutrition, are difficult to check, and the child's health cannot greatly improve as long as they continue.

The great majority of such cases are seen in infants who are themselves not kept clean and who come from homes where dirt abounds. If we could induce the mother to keep the baby clean that would be something, but it is not sufficient if the surroundings are always liable to cause fresh infection. Ointments and dressings of various kinds are not likely to be of very much avail as long as the conditions remain bad. The mother must be taught to give her baby a daily warm bath with soap and water, either at home or at the Baby Clinic or Welcome. The baby's clothes must also be clean, and he must not be allowed to play or roll about in dirty places (see page 70, on the kicking pen). The general hygiene, if poor, must be attended to. Simple saline or boric lotion dressings are better than stronger applications. Ointments should be sterile. Children who show no improvement may be sent to a hospital. It must be admitted that at times all treatment seems to fail, and the condition spontaneously improves when the weather becomes cooler. If the parents are well-to-do the child may be sent to some hill station.

PEDICULOSIS.

Infection of the scalp or other parts of the body with lice ought never to occur in babies properly looked after.

Nevertheless we do see it even in quite young infants. Daily bathing ought to be sufficient to prevent its occurrence. The lice themselves are not difficult to get rid of, but sometimes the eggs or nits are rather persistent. The hair should be cut quite short. The application of kerosine oil generally kills all the nits, but it may be too irritating for the tender skin. A solution of corrosive sublimate may be used (strength 1 in 5000), and Sassafras oil is said to be good.

SCABIES OR ITCH.

The cause of this disease is a small parasite which burrows under the skin. It causes great irritation, and the child scratches the affected parts, which generally complicates the appearance of the disease. The animal causes a tiny black line on the skin which corresponds to its burrow. Its presence may cause a red, raised spot, or a vesicle. A pustule is generally the result of secondary infection after scratching. The parts usually affected are the hands, especially between the fingers, the armpits and feet; babies are liable to be infected in other parts as well.

It is quite possible to avoid itch by perfect cleanliness, a daily warm bath with soap, clean clothes, etc. There is, however, not much use in attending only to the baby if the mother, or indeed any other member of the household, is suffering from itch. In that case the baby is constantly exposed to reinfection. If a case of itch is seen in a baby, the Health Visitor should try to secure that the mother, or any other infected member of the family, receives treatment as well as the baby. Thorough cleansing of the clothes and bedding is absolutely necessary as well as local treatment of the skin.

IMPETIGO CONTAGIOSA.

This is another common skin disease, especially among dirty, poorly nourished children. It is very infectious and hence is seen in children belonging to the same family. It consists of a varying number of vesicles which are first of all filled with a clear fluid which then becomes yellow. After that the vesicle ruptures, and the fluid dries up, leaving a thick yellow crust which gradually falls off. No permanent scar remains on the skin. The parts affected do not itch and there is no redness surrounding them. The most common site is the face, especially about the chin and mouth. It may also occur on the neck and limbs.

A child suffering from impetigo should be shown to a doctor, but the mother or Health Visitor can in the meantime soften the crusts by applying warm olive oil.

SYPHILIS.

We have already mentioned some of the main features of this disease as seen in young infants (see page 28). The disease is, however, so very common and so very far-reaching in its results, that it is well to lay emphasis once more on the symptoms. They are not confined to the skin, but it is convenient to deal with the subject here as the skin affections are very noticeable, and will help the Health Visitor in recognising the disease. If a Health Visitor sees what she thinks to be a case of syphilis in a baby, she should take measures to have the child placed under the care of a doctor at once. She must carefully explain to the parents the serious character of the disease, and tell them of the necessity of prolonged treatment. While pointing out the serious consequences which follow from neglect to have treatment carried out, she should

tell them that the child can in large measure be cured if proper care is taken.

Babies who are the victims of hereditary syphilis are usually born to all appearance healthy. The symptoms make their appearance after a few weeks of life. The first symptom to be noticed is usually a cold in the head, which is rather severe and lasts for a considerable time. There is a great deal of discharge, hence the child has difficulty in taking the breast and in breathing. The inflammation frequently spreads downwards to the larynx, so that the cry becomes hoarse. The rash comes out soon after the cold has begun. It consists of round red spots, which are bright at first but subsequently turn a darker red, and then begin to scale. The rash then fades, but a discolouration remains on the skin for some time. It may be difficult to make out the colour in babies with very dark skins. Sometimes there are raised spots, hard to the touch. And at other times a scaly eruption takes place, especially on the palms and soles. This latter is very characteristic. The spots are most commonly met with on the face, the outer sides of the arms and legs, and the hands and feet. In addition to the rash, we find what are called *fissures* and *mucous patches*. Fissures are common at the corners of the mouth. They are really ulcers, which are very persistent and do not heal. They are deep, and this is why a permanent mark is often left as a result. Mucous patches are found most commonly about the anus, vulva, scrotum and lips. They are raised and pale in colour. The nails of a syphilitic child are often inflamed, and the hair of the head and eyebrows sometimes comes out. The bones are frequently affected, with the result that the child may lose for a time the use of a limb and appear to be paralysed, though free move-

ment was present at birth. The bones of the limbs are most affected; sometimes we see several of the fingers swollen in infants, owing to syphilis. The spleen is almost always enlarged and frequently also the liver.

The child's general health suffers while these symptoms develop. Syphilitic children are generally very fretful and sleep badly. They lose in weight and are anaemic, and are liable to suffer from other diseases which may prove fatal, *e.g.*, pneumonia.

It will probably not be in the power of the Health Visitor to do much to prevent the occurrence of syphilis. She must, however, do all she can to secure treatment for babies suffering from the disease, both for their own sake and for the sake of those who come into contact with them. A syphilitic child must of course never be suckled by a healthy woman. But a syphilitic mother should certainly nurse her baby, as the latter will stand a much better chance of fighting the disease if breast-fed.

Health Visitors must do all in their power to secure that a syphilitic child is placed under reliable medical treatment, and not left to the advice of quacks and patent medicine vendors.

VII. PREVENTION OF EYE AND EAR DISEASES.¹

SORE EYES.

This condition is extremely common in India. In the warm months especially, hundreds of cases among infants are brought to the dispensaries for treatment. Many children lose the sight of an eye, or are left with a permanent defect. This state of affairs is tragic when one considers that the vast majority of cases need not occur at all. That they do occur is the result of imperfect hygiene. If we could prevent infection of the eyes we should save a great many eyes from total destruction, others from partial deformity: we should save many operations and much medicine, and much time of many doctors. In addition we should save the mothers many weary visits to dispensaries which take their time from pressing duties at home.

Mothers can be instructed how to prevent sore eyes, and children also can be taught to be clean from an early age. It may be that mothers are not very willing to profit by such instruction, still we must go on making the attempt.

The greatest number of cases of sore eyes occur when there are most flies about. A little observation will show

(¹) For prevention of *ophthalmia neonatorum* see page 49.

that flies are always buzzing around babies with dirty faces and clothes. Flies like dirt, they are always on the look out for food and for suitable places in which to lay their eggs. They light on a baby with sore eyes, and then pass on to another baby, with healthy eyes, but a dirty face. In doing so they deposit a portion of the secretion, loaded with bacteria, from the eyes of one child on to the eyes of the other. If we can secure that the child's face is thoroughly clean, we lessen the chance of the fly being attracted to it. The same holds good with the clothes. If the clothes are clean and sweet, flies will not buzz in such numbers round the baby. There is no doubt that a great deal of infection is conveyed to the eyes through the medium of flies in this way. Another way in which eyes become infected is through wiping them with dirty rags or with parts of the mother's or child's clothes. We often see the mother doing this and directly infecting the eyes. Frequently also she wipes the eyes of an infected and a non-infected child with the same *chaddar*. Mothers must be instructed that they are to wipe the baby's eyes with clean rags or with cotton wool. Boiled country cotton (*ru'i*) will serve the purpose. The rags or cotton should be destroyed by burning afterwards. Each child should have a separate towel if possible, and *always* if there is any disease.

The surroundings must be kept hygienic. If scraps of food are left lying about, or any refuse or excreta, flies will inevitably come to the scene. All food should be kept covered, and nothing dirty, clothes, or dishes, should be left lying about. Quite young children can be instructed as to the dangers involved. They can be taught not to throw aside scraps of food. They must also be taught not to defæcate in open places. Children who

have been kept clean from infancy and whose mothers have trained them properly have a natural appreciation of clean surroundings and a shrinking from dirty ones.

As regards the more remote surroundings, it is probably not possible for the Health Visitor to do much to improve them. But she should report collections of refuse, etc., in improper places, to the sanitary authorities. Lastly, where possible, people should be taught to keep down breeding of flies by destroying them with papers, traps, etc. For household use a 2 per cent. formalin solution mixed with milk and sugar and placed in a shallow dish, will attract the flies and poison them.

Mothers must also be instructed as to the serious danger of neglecting sore eyes. A discharge, or even a slight redness, should never be regarded as a thing to be taken lightly. Frequently no attention is paid to discharge from the eyes till the eyelid is so swollen that the eye cannot be opened, or there is some visible injury to the eye itself.

DISCHARGE FROM THE EARS.

This is fairly common among babies. It is apt to be rather chronic and does not receive the attention it ought to. The mothers get tired of attending the dispensary, and they do not realise the consequences of neglecting to have treatment properly carried out.

The discharge occasionally comes from the outer part of the ear, as in the case of eczema of that part or a small boil. More usually, however, the discharge comes from the middle ear, or that part of the ear which lies beyond the ear-drum. The discharge, in order to escape, bursts its way through the ear-drum. If the condition remains

untreated, it can be easily seen that the hole in the ear-drum tends to get larger with the constant discharge. As a result the hole cannot heal up even when the discharge has stopped, but remains permanently. The hearing of the child is therefore interfered with.

How is it that the discharge, resulting of course from inflammation, comes from the middle ear? In the great majority of cases, the infection comes primarily from the nose or pharynx, by way of the Eustachian Tube, or passage leading from the pharynx to the ear. As the mucous membrane of the pharynx is continuous with that which lines the middle ear, any inflammation in the pharynx has an easy passage to the middle ear. As the space there is very small and the Eustachian Tube becomes easily blocked, the discharge finds its way out through the external ear by pushing its way through the ear-drum. Discharge from the ear, therefore, follows any condition where there is inflammation of the nose and throat, *e.g.*, an ordinary cold, influenza, measles, enlarged tonsils and adenoids.

In order to prevent the occurrence of discharge from the ears, we must keep the nose and throat in as healthy a condition as possible. The importance of this has been already dwelt upon (see page 115). Discharging ears are apt to be neglected in the same way as sore eyes. Mothers must be warned of the dangers of doing so. The commonest consequence of neglect is deafness, but in addition it may be followed by inflammation of the surrounding bones, inflammation of the coverings of the brain, abscess of the brain, and facial paralysis. Even a slight watery discharge should be carefully watched, and the baby shown to a doctor. This is especially the case if the baby is running a temperature for no other obvious reason, and

if he is fretful and wakeful. Health Visitors should discourage home treatment by syringing or other means as more likely to do harm than good.

VIII. ABNORMALITIES.

CONGENITAL PYLORIC STENOSIS:

This means a condition where there is obstruction at the *pylorus* or outlet of the stomach. It is due either to spasm of the circular muscle fibres of that region or to their overgrowth, or to both conditions combined. The food cannot pass out of the stomach in the proper direction, hence after a certain time it is vomited by the mouth. The vomiting may not occur after each meal, as the milk may be retained in the stomach for some time, and then the stomach gradually becomes distended, and so is able to retain the milk of two or three feeds before ejecting them. The vomiting is very forcible, the stomach contents spurt out, but there is no effort on the child's part, the stomach muscle alone ejects the food without the assistance of the voluntary muscles.

The condition may be noticed from the day of birth, but more usually it comes on during the second or third week of life. The cause of it is not understood. The persistent vomiting may lead the mother to think that her milk is not agreeing with the child, and she may take him off the breast. A nurse may also advise this procedure. Change of food of course has no effect on such a condition. As the food is not being absorbed, the child's weight falls, and constipation is present also because no food passes into the intestines. The muscles

of the stomach wall become hypertrophied in the effort to get rid of the food, and the movements of the stomach may be visible like a series of balls moving under the skin. The actual point of obstruction may also be felt above and to the right of the umbilicus.

In some cases obstruction is not complete, and a certain amount of food passes through the pylorus. In that case the vomiting is less frequent, and not so great in quantity, and the constipation not so complete.

The treatment must be carried out by a doctor, and preferably in a hospital. If a Health Visitor discovers what she thinks to be a case of pyloric obstruction, she must explain the condition fully to the parents, point out its seriousness and insist on treatment. She should not attempt to right the condition herself by changing the diet or other measures, and she should as far as possible prevent the parents from doing so.

IMPERFORATE ANUS.

Occasionally babies are born without a proper opening to the lower bowel. It is a rare but serious condition. It may not be at once noticed that the child cannot pass the bowel contents, but usually after a few hours, or at most a day, the mother notices that the child has not passed meconium. The condition may be discovered by the nurse or *dai* while bathing the child. Sometimes there is a dimple in the skin in the place of the anus, at other times there is absolutely no trace of an opening. The condition must be reported to a doctor at once as the child's life depends on immediate treatment.

IMPERFORATE URETHRA.

This is a similar condition to the above, and is very uncommon. Nevertheless it is always the nurse's duty

to make sure that the baby can pass urine, and if any doubt exists on this point a doctor should be consulted at once.

There are other abnormalities which may occur, connected with the genito-urinary canal. Most of them are so obvious that there is no difficulty in observing them, and the parents will usually seek advice voluntarily.

PART THREE.
THE WORK OF HEALTH VISITORS.

THE WORK OF HEALTH VISITORS.

The term *mortality* means the same as death-rate, and indicates the proportion of those who have died to the living. If we say the death-rate for a certain town or country is 55 per thousand for a certain year, we mean that 55 persons out of every thousand died during that period. The term *infant mortality* is used to indicate the death-rate of children under one year in proportion to the number born, the first year of life being that of greatest danger to the child, and in which the greatest number of deaths occur.

The falling birth-rate (that is the decline in the number of births in proportion to the population) has led people in many parts of the world to attempt to save unnecessary loss of life among infants under one year. so that although the birth-rate fell, the population would not decrease. As a result of various legal measures, improvement in general sanitation, diffusion of knowledge, and philanthropic work, the tendency has been towards a considerable fall in the infant mortality of western countries. Thus in England and Wales, although the birth-rate fell from 35·3 in 1876-80 to 26·3 in 1906-10, the infant mortality fell from 145 to 117 per thousand in the same period.

In India the birth-rate does not show this tendency to fall, but the infant mortality is appallingly high, and this subject is beginning to attract the attention of Gov-

ernment authorities and the educated public. Hence the interest in attempts to improve the conditions of child-birth and infant life as shown in Associations like the Victoria Memorial Scholarships Fund for training *daïs*, the Lady Chelmsford All-India League for Maternity and Child Welfare, and the efforts being made on the part of municipalities in the large cities of India. The need for serious attention to the problem becomes startlingly evident when we glance at the figures. For the decade 1902—11 the infant mortality ranged from 352 per 1,000 births in the United Provinces to 199 in the Madras Presidency. The figures are slightly lower during recent years, but they are still fearfully high. For the same period the infant mortality of England and Wales was 127·3, while that of New Zealand was only 64·3. Recent figures show that the infant mortality rate for England and Wales is now under 100, whereas in India it is still well over 200.

The question naturally arises—if one country can successfully lower its infant mortality rate, is this not also possible in another? We must look at the question from two points of view.

(1) What are the causes which lead to the enormously high rate of infant mortality in India?

(2) What methods can be adopted to lessen it? —

1. CAUSES OF INFANT MORTALITY.

(a) *Ignorance.*

Ignorance should be placed first among the causes of infant mortality. The vast majority of the women of India are illiterate, and have no chance of receiving any instruction in matters pertaining to the care of children. Many of them live in villages where there are either no schools at all, or where only rudimentary education is

given. Even among those women who receive some education, there is a great amount of ignorance. They sometimes receive instruction in physiology and hygiene, but they seldom apply it in a practical way. Training in actual mothercraft is unknown. If there were a greater spread of education we should have one powerful means by which we could dispel ignorance, and disseminate knowledge. The greatest proportion of deaths occurs in the first week and month of life and is due in the main to the ignorance which prevents the infant receiving the proper care it requires at this period. For example, in Calcutta (1919) 31 per cent. of the infant mortality occurred in the first week of life and 45 per cent. in the first month.

(b) Social Customs.

In India marriages are consummated at an early age, and this means that girls become mothers very young, before they are fitted to give birth to, and to look after, babies. They are, however, not left to deal with the problems which face them by themselves. Owing to the joint family system which prevails in India, there are always numberless elder women relatives at hand to give advice. These women themselves, however, are not much more versed in the hygiene of babyhood than the young mothers. They are full of prejudices and superstitions and have deep faith in the practice of bygone days. They employ *daïs*, they consult pundits, they have their own ideas about feeding, clothing, and bathing of infants, and these ideas have usually little relation to physiological fact or the laws of hygiene. They generally object to western systems of medicine and midwifery, and disapprove of visits to hospitals, or to calling in doctors trained on modern lines. The young mothers, and even the young

fathers, supposing them to have some knowledge of better methods, have very little chance of carrying them out in the face of the opposition of the older women of the family. Very many of the customs connected with birth which are held most dear by the people are directly detrimental to health, *e.g.*, the custom of shutting up the lying-in woman in a dark airless room, withholding nourishing food from her, the use of old and dirty clothes and bedding, because they must afterwards be destroyed, the use of earth and cowdung to dress the cord, and many other practices. Purdah is another social custom which contributes to infant mortality. It does this partly by its effect upon the mother who lives a confined unhealthy life and so is liable to disease and to produce weakly infants, and partly by its effects on the child, who has to share in part his mother's confined life. Statistics show that tuberculosis occurs more frequently among the classes which observe purdah owing to the fact that children are exposed to infection in the zenanas.

(c) *Bad housing, Overcrowding, Want of Hygiene.*

In the towns of India the houses are very much crowded together, the rooms are small, and the sanitation very defective. Even in villages, where there is much more air, the houses are not constructed with a view to ventilation or drainage. Again, owing to the joint family system, there are usually too many occupants in each house, the sleeping rooms are overcrowded and are not aired. Want of hygiene is not so much a personal question as one affecting the surroundings. Refuse is allowed to lie about and consequently flies and rats are attracted. Mosquitoes breed in the pools left by faulty construction. The latrine may be close at hand, and as the flushing system is practically unknown, foul smells abound. Open sewers

are found outside the houses, and dust is swept up in such a way as actually to spread disease. In villages the animals belonging to the household, being valuable property, are often housed under the same roof. All these things constitute an environment exceedingly unfavourable for health in both mothers and children. Both in towns and villages the water supply is insufficient and not convenient for the houses. In Bombay statistics have directly proved that the rate of infant mortality varies in direct proportion to the number of rooms in the houses (Health Officer's Report).

(d) Preventable Diseases.

Large numbers of babies perish every year through diseases which are quite preventable. An example has already been given in tuberculosis. (*N.B.*—Babies are not born diseased with tuberculosis, they may be born with a tendency towards the disease which with proper care can be prevented from attacking the child.) In certain parts of India deaths from tetanus are common in the newly born, *e.g.*, Calcutta (1919) 15·1 per cent. Such deaths are of course entirely preventable. Many babies die of congenital syphilis which is not only preventable, but also responds to treatment when present. Gastro-intestinal disorders account for many deaths. These are most common and fatal in artificially fed babies, and are directly due to impure milk, dirty bottles and unsuitable food (*e.g.*, patent foods or condensed milk). Pneumonia and other chest troubles are very fatal to babies in cold weather. The infants are liable to these diseases because they are imperfectly clothed, and because their lungs are not accustomed to pure cold air, as most infants share the bed of the mother in a room from which all fresh air has been excluded.

(e) *Poverty.*

Poverty as a cause of infant mortality undoubtedly ranks high. It is directly related also to other causes, *e.g.*, bad housing, want of hygiene, improper feeding. Poverty reacts in the first place on the mother. Frequently she is of poor physique owing to actual want of a proper amount of nourishing food. (The poorer class women seldom have milk to drink, and cannot afford sufficient *ghi* to provide the necessary amount of fat. The staple diet in North India is *dal* and *chapati*, made from *ata*, which provides practically no fat.) The mother's milk may be deficient from this cause, and when the children are weaned they receive similar diet to the elders, and one deficient in milk, fat, vegetables and fruit. Many babies in Madras for example are fed on rice water because milk is so expensive and scarce. Poverty is also partly responsible for bad housing and overcrowding, and want of provision of sufficient clothing. It may also partly account for the bad ventilation of sleeping rooms where people shut up the house in order to keep warm as they have insufficient bed coverings. Where mothers have to work to earn a living, poverty may cause neglect of the infants, who are frequently handed over to the care of elder sisters of a tender age. Poverty renders proper care of food difficult, the poor cannot afford gauze doors, doolies for food, or ice on which to keep milk in the hot weather. Poverty keeps the whole standard of life low, many millions in India are living on a sum of money insufficient to meet their actual physical needs.

2. METHODS FOR REDUCING THE RATE OF INFANT MORTALITY.

As very little has as yet been done in India in this direction we shall first consider the methods adopted in

other countries, and then see what has been begun in India, and what further measures are possible.

Within the past twenty years, since public interest has been roused in the question of infant mortality, several legal measures have been passed in Great Britain which were framed to protect women during child-bearing, and the lives of children from infancy onwards. Among the first of these was the Midwives' Act (1902). The object of this Act was to prevent unqualified persons from practising as midwife, unless under medical supervision, to prescribe a proper standard of training, and to ensure the registration of all persons practising as midwives, and certified under the Act. Penalties are attached to those who are found infringing the provisions of the Act, and no one is allowed to use the title "midwife" unless she is certified under the Act. A certain number of years was allowed to elapse before the Act actually came into force, so that women, already practising as midwives, should have the opportunity to qualify themselves under the Act. It can easily be seen that an Act of this kind at once fairly effectually prevents malpraxis on the part of midwives, and places within the reach of people the services of properly trained persons. The Act also provides for the inspection of midwives, so that an efficient standard of work may be maintained. The work of all midwives is supervised by inspectors of midwives who are appointed for certain areas. It is now recommended that the inspector of midwives should be, whenever possible, a medical woman. If a medical woman cannot be employed, the inspector must possess not only the C.M.B. certificate, but also substantial midwifery experience. The inspectors of midwives are responsible to the "local authority." The latter varies according to whether the

district considered is a town or country one (urban or rural).

The Midwives' Act also provides for the formation of the "Central Midwives' Board." This important institution undertakes the examination of candidates for its diploma, and grants the diploma. It has also the power to strike a midwife off its roll, or inflict other penalty for misconduct of any kind in her duties. It also lays down what these duties are, and publishes various rules according to which the midwife must conduct her work.

The Midwives' Act of 1918 contains important amendments. One is that the midwife may call in medical aid if required when the local authority is responsible for the doctor's fee. Grants in aid to the local authorities for the provision of midwives are also made.

The Notification of Births Acts (1902 and 1915) have also been passed with the direct object of preserving infant life. In Great Britain the birth of any child is required to be registered by the parent, or other responsible authority, to a civil officer, the Registrar of the district (urban or rural). Such registration may, however, be performed up to six weeks from the date of birth of the child; and furthermore, the medical officer of health of the district (urban or rural) only became aware of the births in the area he supervised, when the returns were given by the registrar to him. When attempts began to be made to visit the households where births had occurred, it was found that the information regarding the births had been received too late, for often the baby had either died or become ill before the Health Visitor had paid her first visit. In order, therefore, that visits might be made as soon as possible after birth, the system of notification of births was introduced in 1907. It was then optional

for any area to adopt the Act. In 1915 it was made compulsory for all areas to do so. This Act provides that the father of the child or some other responsible person shall give notice of the birth in writing to the medical officer of the district. The notice must be given within 36 hours of the birth, whether the child is alive or dead. The Act also provides penalties for failure to notify a birth in accordance with its regulations. In addition to these provisions, the Act empowers the local sanitary authorities to promote the care of mothers and young children in the shape of pre-maternity clinics, infant welfare centres, Health Visitors, etc., etc. The details of the scheme recommended by the medical officer of the Local Government Board are given below.

Another Act of Parliament which deals with the preservation of infant life is the Children's Act. Part of this Act deals with the regulation and inspection of persons undertaking for reward maintenance of children, and details the penalties to which such persons are liable for the neglect of children. (This Act was found necessary because many children were "boarded out" with undesirable persons who were paid for their support, but who neglected or ill-used the children.) The second Part of the Act deals with the prevention of cruelty to children.

The Vaccination Act provides for the compulsory vaccination of children within six months of birth.

The question naturally arises, who are the authorities who are responsible for carrying out these various Acts of Parliament, and what are the bodies which carry out the various activities they involve.

First of all we have the Ministry of Health, until lately the Local Government Board, which is the *central*

authority for the whole country. Its President is a member of the Cabinet (the Government officials or Heads of Department-), and it controls among other things the provisions made in towns and country districts for public health and sanitation.

With regard to the *local authorities* England is divided into country boroughs (large towns), and counties, which comprise urban districts (small towns) and rural districts (village areas). The boroughs have their own sanitary authorities, while in the counties the sanitary authority is usually the County Council. The maternity and infant welfare work of these bodies varies a good deal. Notification of births and inspection of midwives is compulsorily undertaken by all, but there is as yet no compulsion to provide Health Visitors, infant welfare centres and the like, and the amount of work undertaken depends mostly on the enlightenment and public spirit of the local authorities. As an example of the work undertaken by a borough we may quote the summary of its activities given by the borough of Bradford, a town of 288,458 inhabitants, that is somewhat larger than Delhi or Lahore (see Appendix).

The work in counties is naturally less developed both because public opinion is less advanced, and because in rural districts the infant mortality is lower, and the population being scattered, it is more difficult to make provision of a suitable kind. For this reason more than one duty may be carried out by the same person, *e.g.*, the Health Visitor may divide her time between maternity and child welfare work, and tuberculosis visiting. Or the nurse working under the scheme for the medical inspection of school children may give some time to infant welfare work. The duties of Health Visitor and inspec-

tor of midwives are frequently combined, or the Health Visitor may also be the tuberculosis nurse for a given area.

It will be seen that as rule in England the connection between maternity work and infant welfare work is very close, and this is only as it should be. Before the birth the only possible way of caring for the child is through improvement of the physical condition of the mother. Hence the provision of ante-natal clinics has a direct bearing on the welfare of the child as well as that of the mother. The late Local Government Board advised that a complete scheme of Maternity and Child Welfare should comprise the following elements:—

1. Arrangements for local supervision of midwives.
2. Arrangements for

{

Ante-natal.

(1) An ante-natal clinic for expectant mothers.

(2) The home visiting of expectant mothers.

(3) A maternity hospital or beds in a hospital in which complicated cases of pregnancy can receive treatment.
3. Arrangements for

{

Natal.

(1) Such assistance as may be needed to ensure the mother having skilled and prompt attention during confinement at home.

(2) The confinement of sick women (including women having contracted pelves or suffering from any other condition involving danger to the mother or infant) at a Hospital.

4. Arrangements for

Post-natal.

(1) The treatment in a hospital of complications arising after parturition, whether in the mother or infant.

(2) The provision of systematic advice and treatment for infants at a Baby Clinic or Infant Dispensary.

(3) The continuation of these clinics or dispensaries, so as to be available for children up to the age when they are entered on a school register, *i.e.*, the register of a public elementary school, Nursery School, Crèche, Day Nursery, School for Mothers or other school.

(4) The systematic home visitation of infants and children not on a school register as above described.

The details of the scheme explain themselves.

3. (1) refers of course to the provision of properly trained midwives and doctors if need be. In 4 (3) the idea is to keep track of the children during the time elapsing between infancy (that is the period under one year of age) and the time when the children begin to attend school. Since in Great Britain there is medical inspection of all school children, a record is kept of a child's physical condition as soon as he enters school. If the child's previous record can be available for the school medical officer, it will be a valuable help to him.

A complete scheme of this kind is what is being aimed at in England for work in towns, and with modifications, for country districts. It will be seen there is no line marking off the provision for mothers from that for infants.

With regard to the practical working of the scheme, a few details may be given. The ante-natal clinic and the infant welfare centre may be combined in one building, and babies and mothers may attend on the same day. In some cases, however, the ante-natal clinic is part of the out-patient department of a general hospital with a maternity block, or the out-patient department of a maternity hospital. This has its conveniences, for the same patients of course frequently come to the hospital for confinement, or have a nurse sent to their own homes. On the other hand, the former system may be more convenient for the mothers. The staff of a centre consists of a medical officer, health visitors, or health visitors and nurses, and voluntary helpers. The arrangements for medical officers vary; sometimes a whole time officer is appointed in a large town where there may be more than one centre, or the work of the centre may be combined with some other medical work. In any case the medical officer is one who has special experience in infant work. Voluntary workers are extensively used in Great Britain. They may help in the work of the centre, and also visit the homes, and assist in various forms of accessory work, such as the provision of refreshments, advice about clothes, etc., etc.

The accommodation at the centre generally consists of three rooms, one a waiting room, one for weighing babies, etc., and one as a consulting room. Sanitary accommodation is also provided. The rooms are furnished with the necessary articles, and a few simple medicines are prescribed and given. It is the aim of the centres to be preventive rather than curative, however, and both mothers and infants with more serious ailments are sent to hospitals for continued medical treatment. The

centre is an educational force; it should not compete with general hospitals or private practitioners. The keeping of records is an important part of the work of the centre. At some centres there is provision of food and milk. Dinners are sometimes arranged for nursing mothers, and milk is provided cheaply or free of cost. In connection with the centre, classes are frequently carried on for sewing, cooking, etc., to which the mothers come for instruction and help. Much of the infant welfare work in England was started, and is to some extent still carried on, by voluntary agencies, supported by funds locally raised. The tendency is for work of this kind to be gradually taken over by the Borough or County Councils. The various philanthropic bodies who have started such work have been of immense service in paving the way for more official undertakings. There are still numerous Associations existing on a voluntary basis which have as their object the preservation of infant life. Such are the National Association for the Prevention of Infant Mortality, the National Society for the Prevention of Cruelty to Children, the National Baby Week Council, and others too numerous to mention. The last named Association is responsible for the introduction of "Baby Weeks" which have proved a great stimulus to infant welfare work. A "Baby Week" consists of an exhibition, usually lasting a week, dealing with all the aspects of infant life. It is made as educative as possible, and the public of the districts in which it is held is thoroughly prepared beforehand. Such preparations include the instruction of school boys and girls. The girls may be taught simple lessons on mothercraft, home nursing, etc. The boys receive instruction on the more public aspects of hygiene and of sanitation, *e.g.*, the fly danger, etc. (It

is to be noted that the important subject of training girls in mothercraft has received more and better attention in France and Germany than in Great Britain.)

QUALIFICATIONS AND WORK OF A HEALTH VISITOR.

The work of Health Visitors, although much farther advanced in Great Britain than in India, is yet of such recent origin that the qualifications for the work have up till now not been laid down with any strictness. This will soon, however, cease to be the case. The Board of Education has recently issued draft regulations for the training of Health Visitors. Two courses are to be recognised, the one, a full course of two years' duration, intended for ordinary students; and a shorter course of one year's duration, for trained nurses and others possessing substantial knowledge or experience. In addition if the Health Visitor is to undertake duties connected with midwifery, she is required to obtain the certificate of the Central Midwives' Board. The Ministry of Health desires that women employed as Health Visitors should be possessed of a good general education which is to be followed by a special course. The institutions at which these special courses are conducted must be recognised by the Ministry of Health and they must be connected with a university. The students will pass qualifying examinations at the end of the course.

Stress is also laid on the personal qualities of the Health Visitor. Tact, sympathy, and good humour are as necessary as technical information to the Health Visitor. Her *work* varies from place to place. As we have already noted, in some cases it is combined with the work of an inspector of midwives, a school nurse, or a tuberculosis nurse. Usually the main work may be divided into work at a centre (prematernity or infant

welfare, or both), and home visiting. Home visiting is regarded as important because experience has shown that only about one quarter of the mothers in a given district usually attend a centre. They must therefore be reached by home visiting. The visits of the Health Visitor may begin as soon as those of the midwife cease. In fact the visits of the two should slightly overlap, or coincide so that the Health Visitor may obtain from the midwife any necessary information about the newly born child. The duties of the Health Visitor are to advise the mothers in any way necessary as to the hygienic upbringing of the child. A most important point is the encouragement of breast-feeding whenever possible. The Health Visitor will also give advice about methods of feeding the child, about bathing and clothing him, etc., etc. She will encourage the mother to take the child to the centre for weighing and for doctor's advice if necessary, and give warning and advice at times when there are epidemics of measles, diarrhœa, whooping cough, etc. The number of visits to any one baby will naturally vary with the health of the baby concerned. The younger the child, the more frequent will be the visits. The number of visits that a Health Visitor can profitably pay in one day is not more than 15. On this basis it is calculated that one Health Visitor is necessary for every 500 births. As in the centres, the keeping of records is an important part of the work of a Health Visitor.

At the centres themselves the work will be similar, but will include weighing of babies and will be conducted under the doctor's supervision. The centre is usually open once a week. The Health Visitor has to see that the babies are undressed and weighed and shown to the

doctor. She has to keep the mothers interested and convey the maximum of instruction in a tactful manner. The doctor need not see each baby every week provided satisfactory progress is being made.

When we turn to consider the state of things in India we find great differences, not merely in the lack of provisions for maternity and infant welfare work, but in the administration of the Health Departments. In addition we have vast differences in the climate, the mode of life and social customs of the people. These things must be carefully considered when we attempt to plan new work in a country like India, and it is not at all advisable to think that we can transfer wholesale to India methods that have proved useful in England. The needs in the shape of removing bad conditions, relieving suffering, and making possible healthy childhood, may be the same, but the means by which the needs are to be met may differ widely.

The account just given of the various methods now being adopted in western countries is therefore given in order to be suggestive, rather than to lay down definite plans of how advance may be made in India.

The larger cities of India have now well paid, thoroughly qualified men in charge of the Health Departments. These are as yet comparatively few in number. The Health Departments of smaller towns are under the Civil Surgeons of the district. These officers have of course a great deal of other work to do in addition. The sanitary department of a whole province is under a Sanitary Commissioner who is responsible to the Governor or other head of the province. Some of the provinces have now well worked out schemes for the provision of Sanitary Inspectors of various grades to look after the sanitation of towns

and villages. These are all men at present, except the United Provinces where a scheme for training women sanitary inspectors has been started. Their work therefore naturally confined to public streets and buildings, etc., the private houses where insanitary practices are carried on, and without the control of which public sanitation can only be half carried out, are not inspected.

With regard to maternity work, with which we are here specially concerned, the health departments make very little provision. In a few large towns there are women's hospitals to which the Municipalities give grants of money, and there are small women's departments attached to the civil hospitals. The latter have the disadvantage, especially in North India, of not being separated sufficiently from the men's department, and in addition they are usually inadequately staffed. In addition to the hospital accommodation, some hospitals have one or more *dais* on the staff who can be sent out to cases when required. The same arrangements hold good in private hospitals, mission and other. Patients are received for their confinement or may have a nurse or *dai* sent to them in their homes. The number of women in India thus attended during childbirth is but a fraction of the total. The vast majority of Indian women are confined by the ordinary *dai* who carries on a private practice after her own fashion, is uncontrolled, unsupervised, and responsible to no one. These *dais* belong to special castes or classes, and the profession is usually hereditary, passing from mother to daughter or daughter-in-law. The older members teach the younger what they know, and beyond this they receive no training. They are of low caste, poor, uneducated and no less superstitious than the majority of their fellow countrywomen.

Their practices are well known, and also the harm they do, and time need not be spent here in giving unsavoury details. Suffice it to say that they cause an immense amount of suffering, permanent injury, and loss of life, both among the mothers, and the infants they try to help into the world. At the same time it should be remembered that the *dai* is very poorly paid and is expected to do a great deal of menial work.

Of late years feeling has been growing that these practices must be put a stop to, and that to accomplish this the *dai* must either be made to mend her ways, or be replaced by more capable persons. Unfortunately this movement has not arisen from among those who suffer at the hands of untrained *dais*, but mainly from among the women doctors who are in a position to see the results of the *dais'* work. They in their turn have brought the matter to the notice of the Government, and have, in several cases, themselves begun to make efforts to lessen the evil by training the *dais*. The pioneer work in this direction was done by a missionary in Amritsar who, by payment of a small sum, induced the *dais* to come to classes for instruction, and to report their cases. These cases were inspected, and rewards given if mother and baby were found to be in a satisfactory condition. By this means also the *dais* got to know the doctors and became willing to call them in for difficult cases. Work of this kind was taken up in other places chiefly by doctors working in mission hospitals. The result of the attempt to rouse the authorities to action was first seen in the founding of the Victoria Memorial Scholarships Fund. This fund provides money for work among *dais* just described, and also gives stipends to other women to undergo training at specified hospitals.

The results of these efforts have been varied, in so cases there has been conspicuous success, in others the has been equally conspicuous failure. The majority women doctors have come to the conclusion that it useless to train the indigenous *dai* unless her work subsequently supervised. Granted supervision, th believe she can do useful work. Government officia (men) incline to the view that it is of no use to try a train the ordinary *dai* and that she must be replaced b another class. A full consideration of the question well as an account of the *dai* and her work will be foun in the Victoria Memorial Scholarships Fund Report f 1917, which can be had from the Honorary Secretary the Fund, Simla. All Health Visitors should obtain an study this valuable report.

In addition to the efforts which have been made t train the indigenous *dai*, or replace her by other bette trained midwives, one or two other schemes have bee started in some of the big towns. We shall notice the briefly.

The Lady Willingdon scheme for *Bombay* is the mos advanced of these, and has proved very popular. I seems well adapted to the conditions of life there. Unde the scheme several different methods are employed wit a view to reducing maternal and infant mortality durin childbirth.

These are:—

1. Small Hospitals, which are situated in the poorer quarters of the town, where the people actually live. They are simple in construction, and made as attractive as possible to the patient by reducing rules, etc., to a minimum compatible with efficiency, so that patients will wish to come. There are three such hospitals now, one

being worked by the municipality. In two, qualified women doctors give their whole time to the work. The Hospitals are very popular.

2. Health Visitors. There are ten under the scheme as well as two under the municipality. Their work consists in visiting the houses, giving homely talks on infant welfare, etc., reporting insanitary houses and unvaccinated children, sending cases to the maternity homes, reporting cases for relief, etc., etc.

3. Training of *dais*. Lectures are given to indigenous *dais* at one of the maternity homes. They also see cases properly conducted at the home. In addition, stipends are given to women who are received as resident pupils at the homes, and trained as midwives.

4. Voluntary workers. These are ladies who are attached to the various sections into which the town is divided. They visit with or without the Health Visitors, and do similar work.

5. Infant Milk Depôts. These are the most recent activities of the scheme. They are run in connection with the maternity homes. Pure Pasteurized milk is supplied either at 1 anna per seer, or free to those who are poor.

The expenses of the scheme are met from public subscriptions.

The Lady Willingdon scheme is the most advanced of its kind in India, and it seems well suited to Bombay conditions. Whether it would be equally applicable in, say, North India is not certain, as women in the North are so much less willing to leave their homes at the time of confinement.

The *Calcutta* Corporation have a partially worked out scheme for maternity and infant welfare work. Under this scheme the city is divided into six districts. In each of these there should be a centre. To the centre are attached a midwife supervisor and four midwives, also a Health Visitor. The district is sub-divided into four smaller districts, each under charge of one midwife who attends all midwifery cases in that district. The midwife supervisor visits the cases in the lying-in period, and can give help to the midwives when requested. The Health Visitors visit the infants in the district and organise a baby clinic at the centre.

The whole scheme is not yet in working order. Recently the *Calcutta* Corporation have taken up the idea of small maternity homes on the lines of those in *Bombay*.

The *Madras* corporation have recently appointed a fully qualified medical woman as superintendent of their child welfare scheme. Under this scheme a centre has been established in the poorest quarter of the city. Eight midwives live at the centre and attend cases in the quarter. There is also a dispensary at the centre for the treatment of pregnant and nursing women, and their infants. The dispensary has proved popular, and the number of calls to the midwives has regularly increased, showing that one of the objects, "to displace the barber midwife," is being accomplished to some extent. Recently a second centre has been opened and further developments are contemplated.

The *Madras* Social Service League also undertakes work of this kind.

The *Karachi* Health Association was founded in January, 1918, and has for its objects the endeavour to

reduce the infant mortality, to educate the people in hygiene, and to create a public opinion with regard to the prevention of disease. The Association has appointed one Health Visitor, who supervises and assists three trained midwives, and visits among the mothers and children, giving simple advice, etc. Lectures on hygiene to women are also given, and various other activities are planned.

At *Lahore* a scheme is being started for a well organised centre superintended by two English trained Health Visitors. These ladies will also undertake the training and supervision of midwives and probably the training of Health Visitors. Classes on hygiene, physiology, and other subjects are also held for women by the Society for the Promotion of Scientific Knowledge.

In *Delhi* there are now four Health Visitors working under the municipality. Great progress has been made in the work of training and supervising the indigenous *dais*. Two Baby Welcomes have also been started in the city which have proved very popular. Further extension of this work is contemplated.

In other places also, especially in the Punjab, small beginnings are apparent, either voluntary charitable efforts, or under municipalities.

A good many hospitals undertake the training of indigenous *dais* and other midwives, aided by the Victoria Memorial Scholarships Fund, and sometimes by municipalities, or other public bodies.

The Punjab Government has taken a very good forward step in forming a Midwives' Board on the lines of the Central Midwives' Board in England. This board undertakes the examination of midwives and *dais*,

prescribes rules for their training, and grants diplomas. The way is thus being paved for the registration of all midwives, and for a much greater degree of control over their practices.

Most of the schemes are as yet quite inadequate to meet the needs of the cities they are dealing with, and the rural areas have practically not been touched; still, they are beginnings, and have great possibilities of future development. No one scheme will fit all parts of India when we have to deal with so many differences in race, custom, and climate. Every scheme must be worked out with special reference to the conditions prevailing in the locality. It follows from this, that the duties of Health Visitors will vary in different places. While all schemes are in the initial stages, the Health Visitor has a great responsibility in thinking out the various methods which seem to her to be most likely to be beneficial to her own town or district. As she will frequently be working under a municipality largely ignorant of the work, or a medical officer who is already overburdened with other duties, the task of creating her work will largely fall to herself.

A great responsibility, therefore, rests on the one who takes up work of this nature. Throughout this book, the endeavour has been made to emphasise the *preventive* aspect of Health Visitors' work. This adds to its responsibility. The Health Visitor must see to it that her work is on these lines or it is useless; there are other means of dealing with disease when it is discovered. The Health Visitor has the greater task of preventing its occurrence. In so doing she has a boundless opportunity, not merely of averting physical suffering, but of uplifting the standards of the people with regard to hygiene and

morals. She may often be discouraged by the ignorance and prejudice she meets with in her work, but she must try to overcome them with real friendship and interest. She must not forget that many apparently irrational habits are deeply rooted in social and religious customs of long standing. A knowledge of these customs and of the language are absolutely essential to her. Combined with this she must have an unflagging enthusiasm for her work, an ability to observe, and to use her judgment wisely, and a never-failing supply of tact and good humour.

APPENDIX.

APPENDIX.

KNITTED VEST.

Two No. 10 needles.

2 ply wool.

The Back.

Cast on 50 stitches, knit plain for 120 rows, cast off.

The Front.

Cast on 37 stitches, knit plain for 92 rows.

93rd row, slip 1, knit 2, together, knit to the end of the row.

94th row, knit plain.

Repeat these two rows twice.

99th row, knit as 93rd row.

100th row, knit plain till 3 stitches are left, knit 2 together, knit 1.

Repeat these two rows twice.

105th row, cast off 8 stitches, knit to the end.

106th row, knit plain.

107th row, knit as 93rd row.

108th row, knit plain.

Repeat these two rows 6 times.

Cast off. Make a second piece the same.

The Sleeves.

Cast on 52 stitches. Knit plain, decreasing every 7th row, one stitch at each end. Knit for 48 rows. Then knit 1 plain, 1 purl, for 16 rows. Cast off.

Sew up sides and shoulders and sew in sleeves.

Fasten with ribbon or tape in two places, making the fronts overlap.

KNITTED BOOTIES.

Four No. 14 needles.

2 ply wool.

Cast on 40 stitches.

Knit 2 plain, 2 purl for 16 rows.

17th row, knit plain.

Knit 40 rows plain knitting.

57th row, knit 2, wool forward (that is, make a stitch), knit 2 together, repeat to the end of the row. This makes holes for the ribbon or cord.

58th and 59th rows, knit plain.

Knit 14 stitches, then take another needle and knit the next 12 stitches backwards and forwards for 34 rows.

Pick up 17 stitches on each side of the instep, arrange the stitches on two needles, and begin knitting again where the 14 stitches were left. Knit backwards and forwards for 14 plain rows.

Knit 6 plain rows decreasing at the beginning and end of each needle.

Cast off and sew up.

Run ribbon or cord through the holes.

FLANNEL VEST, WARM KURTA AND BIB.

The paper patterns of these will be supplied, on receipt of postage, as. 3, by the Secretary, Lady Chelmsford League, Viceregal Lodge, Simla.

BARLEY JELLY.

Take two tablespoonfuls of Robinson's Patent Barley and make it into a paste with a little cold water. Then add $\frac{3}{4}$ of a pint of boiling water. Boil the mixture for half an hour, and add water up to $\frac{3}{4}$ of a pint. Strain it through muslin, while hot, and cool quickly in running water.

This jelly can also be made with pearl barley, but it must be boiled slowly for about three hours. Four tablespoonfuls will be required.

WHEAT JELLY.

Take two or three tablespoonfuls of rather fine wheat meal (dalya), and then make in the same way as barley jelly.

RICE JELLY.

This is made in the same way as Barley jelly.

TO MAKE WHEY.

Take one pint of fresh milk and heat it to 100°F. Add one teaspoonful of rennet, and stir. Let the milk stand for a quarter of an hour, and then break up the curd which will have formed with a fork. Heat the mixture to 155°F. and keep it about that temperature for five minutes. Strain the whey through muslin. *N.B.*—The temperature must be raised the second time in order to destroy the action of the rennet.

If the use of rennet is objected to, whey may be made with tartaric acid as follows: Take gr. XV of tartaric acid and dissolve in a teaspoonful of water. Heat one pint of milk till it begins to bubble, and then add the tartaric acid solution. Simmer for five minutes, or until curdling takes place. Strain through muslin.

MILK TABLES.

It is necessary again to emphasise the fact that the following milk tables are given merely to serve as rough guides for the feeding of babies. Each baby must be studied separately and with intelligence, so as to find out his individual needs. Only in this way can infant feeding be successful.

In the following table the proportions of milk and water only are stated. Sugar of milk must be added in proportions suitable to the age of the baby (see text). Cream may also be added if its source is reliable, and the baby is able to digest it.

Age	No. of Feeds.	Oz. per feed.	Dilution.	Oz. per 24 hrs.
			Water. Milk.	
3 days.	6.	1.	3 part. 1 part.	6.
10 days.	6.	3.	2 „ 1 „	18.
4 weeks.	6.	4½.	1 „ 1 „	25½.
4th month.	5.	6.	1 „ 1 „	30.
7th month.	5.	7½.	1 „ 2 „	37½.

GRUELS.

For the purposes of diluting milk, these gruels are made in the same way as that described for making jellies for older children, only smaller quantities of the cereal are used. For example, one-

dessertspoonful of barley flour will be sufficient or one tablespoonful of pearl barley. The boiling and straining processes are identical.

BRADFORD.—POPULATION, 288,456.

Midwives.—Fifty (30 trained). They attend about 55 per cent. of the births. They are supervised by a whole-time lady inspector, who made 649 visits to them during 1916, and 210 special visits to cases of *ophthalmia neonatorum*, etc. She also made enquiries respecting 70 stillbirths, and visited cases of puerperal septicaemia.

The Town Council provide the services of a midwife and medical assistance for aid in confinement of necessitous women; they now employ five municipal midwives.

Health Visitors.—Eighteen H.Vs. who each give one-sixth of their time to cases of tuberculosis. Infants are visited as soon as possible after birth when midwives are in attendance, and also when doctors are attending in poor houses. Visiting is continued until children reach school age. In 1916, 36,087 visits were made to 3,851 infants. Of 2,989 infants under observation throughout their first year, 1,014, were breast-fed for more than nine months, 1,407 for more than six months, 1,332 for less than six months, 30 were partially breast-fed and 211 hand-fed from birth. Hand-feeding was necessitated in many cases through mothers going out to work, 364 going to work within three months before confinement, and 520 within six months after confinement.

Centres.—Three municipal centres, (a) an ante-natal clinic at the Maternity Hospital, (b) an infant consultation and clinic at the Infants' Hospital, and (c) a clinic for children of one to five years. (a) is open every morning, (b) is open every morning and on four afternoons weekly. Three medical officers devote all their time to the Infants' Hospital and clinic, and 14 nurses, 6 clerks, a dispenser and an attendant are wholly employed at the clinic. Infants are weighed, medically examined and treated, and drugs, dried milk and other foods are supplied or sold, and clothes are also sold. Mothers are advised respecting their own health as well as that of their infants, and are instructed as to feeding, clothing, etc., of babies. At the clinic for children from one to five years, two whole-time medical officers and four nurses are employed.

Ante-natal Work.—Expectant mothers are visited by the H.Vs., who give advice and invite attendance at the ante-natal clinic for medical advice and assistance.

Feeding Centres.—Seven feeding centres have been established by the Town Council. The food is prepared in a central kitchen and distributed to the centres where necessitous expectant and nursing mothers are served with dinners by voluntary helpers.

Hospital Treatment.—The Town Council have provided a Maternity Hospital with 20 beds, and an Infants' Hospital with 20 cots in one ward, where infants suffering from malnutrition, rickets, etc., are received. Accommodation for mothers has not been provided as these disorders occur chiefly in hand-fed infants, and consequently breast-fed infants cannot be received as in-patients. Cases of opthalmia neonatorum and puerperal septicaemia are treated in accommodation specially provided at the Isolation Hospital, where there is also a department for specialised treatment of diseases of the ear, eye, throat and nose.

Milk Depôt and Milk Laboratory.—Milk is cooled and kept in cold storage until it is distributed, and milk foods prescribed in the clinic are made up in the laboratory. The milk and milk foods are supplied free to many infants of the poor.

[Local Government Board's *Report on the Provision for Maternity and Child Welfare*, 1917.]

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